



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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Date Stamped: September 9, 2013

Mr. Scott G. Silverstein
Footprint Power Salem Harbor
Development LP
1140 Route 22 East, Suite 303
Bridgewater, NJ 08807

RE: SALEM
Transmittal No.: X254064
Application No.: NE-12-022
Class: OP119
FMF No.
**PROPOSED AIR QUALITY PLAN
APPROVAL**

Dear Mr. Silverstein:

The Massachusetts Department of Environmental Protection (MassDEP), Bureau of Waste Prevention, has reviewed your Major Comprehensive Plan Application (Application) listed above, dated December 21, 2012. The Application was supplemented with amendments thereto dated April 12, 2013, June 10, 2013, June 18, 2013, August 6, 2013, August 20, 2013, September 4, 2013, and September 9, 2013. This Application concerns the proposed construction and operation of a 630 megawatt (MW) nominal combined cycle electric generating facility (the proposed Facility) to be located at 24 Fort Avenue in Salem, Massachusetts, the location of your existing power generating facility (Salem Harbor Station). With duct firing under summer conditions, the proposed Facility will be capable of generating an additional 62 MW, for a total of 692 MW. The Application bears the seal and signature of George S. Lipka, P.E., Massachusetts Registered Professional Engineer number 29704.

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-J, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Proposed Plan Approval** for said Application, as submitted, subject to the conditions listed below.

This **Proposed Plan Approval** combines and includes: the 310 CMR 7.02 Comprehensive Plan Approval and 310 CMR 7.00: Appendix A Emission Offsets and Nonattainment Review Approval. This **Proposed Plan Approval** allows for construction and

operation of the proposed Facility, and provides information on the proposed Facility description, emission control systems, emissions limits, CEMS, COMS, monitoring/testing, record keeping, and reporting requirements.

Between March 3, 2003 and April 11, 2011, the United States Environmental Protection Agency (EPA) Region 1 administered the PSD Program in Massachusetts. Effective April 11, 2011, a Delegation Agreement between MassDEP and EPA Region 1 was finalized for MassDEP to resume administration of the PSD Program in Massachusetts pursuant to 40 CFR 52.21 and the terms of the Delegation Agreement. Therefore, MassDEP is concurrently issuing a separate **Draft PSD Permit** for the above described Facility.

The **Fact Sheet** for the **Draft PSD Permit** is attached to this **Proposed Plan Approval**. This **Fact Sheet** also explains MassDEP's evaluation of Best Available Control Technology (BACT) for emissions of pollutants subject to PSD review and air quality impacts. MassDEP verified and concurs with the BACT and Lowest Achievable Emission Rate (LAER) analyses for pollutants not subject to PSD review in the Permittee's Application. The PSD Permit and the 310 CMR 7.02 Comprehensive Plan Approval process have the same review considerations for these items for this Facility.

Please review the entire Proposed Plan Approval, as it stipulates the conditions with which the Facility owner/operator (Permittee) must comply in order for the Facility to be operated in compliance with this Plan Approval.

1. DESCRIPTION OF FACILITY AND APPLICATION

Footprint Power Salem Harbor Development LP (the Permittee) proposes to construct and operate a nominal 630 Megawatt (MW) natural gas fired, quick start (capable of producing 300 MW within 10 minutes of startup) combined cycle electric generating facility (the proposed Facility) at Salem Harbor Station. With duct firing under summer conditions, the Facility will be capable of generating an additional 62 MW, for a total of 692 MW. Construction of the Facility is scheduled to begin in June 2014 and continue for a period of approximately 23 months. The Facility is expected to commence commercial operation in June 2016. The existing Salem Harbor Station is comprised of four (4) steam electric generating units (Boiler Units 1, 2, 3, and 4). Boiler Units 1 and 2, 84 MW and 81 MW, respectively, and both primarily coal fired, were removed from service on or prior to December 31, 2011. Boiler Unit 3, a 150 MW primarily coal-fired unit, and Boiler Unit 4, a 440 MW primarily oil fired unit, are required to cease operation, permanently shutdown, and be rendered inoperable no later than June 1, 2014 (see Final Amended Emission Control Plan Approval, Application No. NE-12-003, Transmittal No. X241756).

The proposed Facility will be constructed on approximately 20 acres in the northwestern portion of the approximately 65 acre Salem Harbor Station site. The Salem Harbor Station site is bordered by Fort Avenue and the South Essex Sewerage District (SESD) wastewater treatment plant to the north; Salem Harbor and Cat Cove to the east and northeast; the Blaney Street Ferry terminal and several mixed-use buildings to the southeast; and by Derby Street and Fort Avenue to the west. Residential neighborhoods and the Bentley Elementary School are located to the

west across Fort Avenue and Derby Street. Terrain elevations rise gradually to the north, west, and southwest, with elevations rising 200 feet or more within approximately 10 kilometers.

The proposed Facility will be configured as two emission units (EU1 and EU2) each capable of operating independently in order to respond to ISO – New England (ISO – NE) dispatch requirements. EU1 and EU2 each will include one General Electric (GE) Model 107F Series 5 combustion turbine generator (CTG), one duct burner, one Heat Recovery Steam Generator (HRSG), and one steam turbine generator (STG). EU1 and EU2 each will have a nominal generating capacity of approximately 315 MW (346 MW with duct firing). EU1 and EU2 shall each burn natural gas with a sulfur content that does not exceed 0.5 grains per 100 standard cubic feet (pipeline natural gas) only in the CTG and duct burner. Based on an ambient temperature of 90 degrees Fahrenheit, each CTG/duct burner pair shall be restricted to a maximum design firing rate of 2,449 million British thermal units per hour (MMBtu/hr), higher heating value (HHV), in combination. EU1 and EU2 shall each be restricted to a maximum fuel heat input of 18,888,480 MMBtu per twelve month rolling period.

Other auxiliary equipment at the Facility will include an 80 MMBtu/hr, HHV auxiliary boiler (EU3), a 750 Kilowatt (KW) electrical output emergency engine/generator set (EU4), a 371 brake horsepower (bhp) fire pump engine (EU5), an aqueous NH₃ storage tank, an auxiliary cooling tower, a demineralized water tank, a fire protection service water tank, and generator step-up (GSU) transformers.

EU3 shall be equipped with Ultra Low NO_x burners and shall burn pipeline natural gas only. EU3 shall be restricted to a maximum fuel heat input of 525,600 MMBtu per twelve month rolling period and will primarily be used to provide steam needed for plant start-up if the combustion turbines are off-line, but also to provide process steam for other plant equipment.

EU4 and EU5 shall each burn ultra low sulfur diesel (ULSD) fuel oil (with a sulfur content that does not exceed 15 parts per million) only and will be required for backup electrical power if no power is available internally or from the utility grid and for fire protection service, respectively. EU4 and EU5 shall each be used for emergency purposes only and shall each be restricted to no more than 300 hours of operation per twelve month rolling period.

During normal operating conditions, EU1 and EU2 shall each operate in combined cycle mode only. The first stage in combined cycle mode involves combustion of natural gas in the combustion turbine with Dry Low Oxides of Nitrogen (NO_x) Combustors to produce thermal energy that is converted into mechanical energy to drive the turbine compressor section as well as the generator that produces electrical energy. Under periods of operation when more electrical power is needed, evaporative coolers located at the inlet air assembly of each turbine are employed to evaporate a water mist into the turbine inlet air in order to cool the inlet air to the combustion turbine. Cooler inlet air is denser, and with higher mass flow of inlet air, the turbine can fire more natural gas and therefore produce more electrical energy than it otherwise would produce if the evaporative coolers were not in operation.

In the second stage of combined cycle mode, the hot exhaust gases, with temperatures in excess of 1000 degrees Fahrenheit exiting the combustion turbine, pass through a three pressure level HRSG, which uses the heat from these gases to produce steam. Each HRSG houses an

oxidation catalyst for carbon monoxide (CO) and volatile organic compounds (VOC) control, followed by an ammonia (NH₃) injection grid and selective catalytic reduction (SCR) catalyst for control of NO_x. The steam produced by the HRSG is then directed to the STG where heat energy is extracted and converted to additional electrical energy. The exhaust gases exiting the combustion turbine also contain sufficient oxygen to allow the placement of a supplemental firing burner in the duct (duct burner) allowing the production of additional steam, which increases electrical energy production in the STG. An air-cooled condenser (ACC) is used to condense the steam exiting the steam turbine and return the water produced to the HRSG through a system of pumps and control mechanisms. Efficiency is enhanced in this cycle by using reheat systems as well as using waste steam to heat feed water in the HRSG, thereby improving overall efficiency.

Overall energy efficiency at the proposed Facility will be further improved by reducing the plant parasitic load. High efficiency exterior and industrial interior Light Emitting Diode (LED) lighting will be used throughout the proposed Facility, including in the Administration Building and Operations Center. The analysis provided by the Permittee shows that operational energy savings in Watts of 30 percent and 38 percent are expected for exterior and industrial interior lighting, respectively, when compared to standard lighting. Based on a total energy savings of 248 MW-hours per year and the proposed Facility's carbon dioxide (CO₂) emission rate of 825 pounds per MW-hour net to the grid, avoided CO₂ emissions via usage of LED lighting amount to 102.3 tons per year. Variable speed drives will be used for all ACC fan motors and the primary boiler feed water pump and condensate pump motors. Piping and valves to reduce pressure losses will be considered in the detailed plant design. The highest efficiency commercially available transformers compatible for interconnection with the nearby National Grid switchyard will be installed.

Continuous Emissions Monitoring Systems (CEMS) shall be installed on EU1 and EU2 to sample, analyze and record NO_x, CO, and NH₃ concentration levels, and the percentage of oxygen (O₂), in the exhaust gas from each of the two HRSG exhaust flues. Samples shall also be taken in the turbine exhaust upstream of the SCR system in order to provide data to optimize usage of the NH₃ injection control systems. In addition, Continuous Opacity Monitoring Systems (COMS) shall be installed in the stacks of EU1, EU2, and EU3 to monitor and record opacity.

Most of the proposed Facility's power plant equipment will be housed in a building structure that will be approximately 115,000 square feet. In addition, the Facility will include areas within other buildings for administrative and operating staff, warehousing of parts and consumables, and maintenance shops and equipment servicing. All of the operations at the proposed Facility will be contained within these buildings or conducted behind screening to minimize visual impacts.

The proposed Facility will interconnect with the National Grid transmission system at two (2) locations within the existing National Grid switchyard located on site. One unit of the proposed Facility will interconnect at the same location where the existing Boiler Unit 4 is presently connected. The other unit of the proposed Facility will interconnect at a new circuit breaker bay to be constructed within the existing National Grid switchyard.

Natural gas will be delivered to the site via a new pipeline owned and operated by

Algonquin Gas Transmission, a subsidiary of Spectra Energy (Spectra). The pressure, capacity, and route of the new pipeline are still being developed by Spectra. Spectra will also construct an on site natural gas metering station. Spectra will obtain all federal, state, and local approvals for the above equipment, as necessary.

2. EMISSION OFFSETS AND NONATTAINMENT REVIEW

Review considerations with respect to 310 CMR 7.00: Appendix A Emission Offsets and Nonattainment Review (Appendix A) are not part of the PSD Review Process and are therefore not addressed in the **Fact Sheet**. Therefore, MassDEP's evaluation of Emission Offsets and Nonattainment Review for the construction of the proposed Facility is provided below.

Appendix A applies to a new major source or major modification of an existing major source located in a non-attainment area; or that is major for NO_x or VOC emissions. With respect to NO_x and/or VOC emissions, Appendix A applies for a new major source of fifty (50) or more tons per year or a major modification of an existing major source amounting to an increase of twenty five (25) or more tons per year. Appendix A requires new major sources, or major modifications thereat, to meet Lowest Achievable Emission Rate (LAER) and to obtain emission offsets at a ratio of 1.20 to 1, plus a five (5) percent set aside that must be held and can neither be sold nor used elsewhere. This yields an overall offset ratio of 1.26 to 1. LAER is defined in Appendix A as the more stringent rate of emissions of: (a) the most stringent emissions limitation which is contained in any State Implementation Plan (SIP) for such class or category of stationary source, unless the owner or operator of the proposed stationary source demonstrates that such limitations are not achievable; or, (b) the most stringent emissions limitation which is achieved in practice by such class or category of stationary source.

The proposed Facility is expected to commence commercial operation in June 2016. The proposed Facility shall be restricted to 144.8 and 28.0 tons per year of NO_x and VOC emissions, respectively. Therefore, the proposed Facility is a new major source of NO_x emissions and is subject to Appendix A for its NO_x emissions. The proposed Facility is required to meet LAER for NO_x emissions and the Permittee must obtain NO_x emission offsets at a ratio of 1.26 to 1. Since VOC emissions from the proposed Facility are below the new major source threshold of fifty (50) or more tons per year, the Permittee is not subject to regulation under Appendix A for LAER and emission offsets pertaining to VOC emissions. However, the VOC emissions from the proposed Facility are subject to, and must comply with, Best Available Control Technology (BACT) pursuant to 310 CMR 7.02.

The Permittee has proposed a NO_x emission limit for EU1 and EU2 of 2.0 parts per million by volume, dry basis, corrected to 15 percent Oxygen (ppmvd @ 15% O₂), one hour block average. The Permittee provided a LAER analysis in the Application that included the sources of data reviewed in support of this NO_x LAER determination. These sources were EPA's RACT/BACT/LAER Clearinghouse, EPA's Region IV National Combustion Turbine Spreadsheet, the California Air Resources Board BACT Clearinghouse, the South Coast Air Quality Management District BACT Clearinghouse, and New Jersey's State of the Art Manual for combustion turbines. The LAER analysis concluded that there are no large natural gas fired combined cycle turbines where a NO_x emission limit of less than 2.0 ppmvd @ 15% O₂ has been

approved and subsequently demonstrated in practice. In addition, the two most recent NO_x LAER determinations for similar Massachusetts projects such as Brockton Power Company LLC (Application No. 4B08015, Transmittal No. W207973 dated July 20, 2011) and Pioneer Valley Energy Center LLC (Application No. 1-B-08-037, Transmittal No. X223780 dated December 31, 2010) were also 2.0 ppmvd @ 15% O₂, one hour block average, during natural gas firing. MassDEP has verified and concurred with the Permittee's LAER analysis as presented in this Application that this NO_x emission limit constitutes NO_x LAER for the proposed Facility.

The proposed Facility is a new major source of NO_x emissions restricted to 144.8 tons per year and the Permittee must obtain NO_x emission offsets at a ratio of 1.26 to 1. The total number of NO_x emission offsets needed for the proposed Facility is (144.8) multiplied by (1.26), or 183 tons per year. In accordance with 310 CMR 7.00: Appendix A(6), for a new major stationary source of NO_x located in an area that is not a nonattainment area, prior to commencing operation of any emission unit(s), for which offsets are required under Appendix A, NO_x emission offsets must actually occur and be obtained from the same source or other sources within the Ozone Transport Region.

The Permittee entered into an agreement on February 5, 2013 to purchase 59 tons per year of rate-based NO_x Emission Reduction Credits (ERCs) from The Newark Group Inc. These ERCs were created and banked on April 7, 2010 by MassDEP, pursuant to the provisions of the Commonwealth of Massachusetts Air Pollution Control Regulation at 310 CMR 7.00: Appendix B, due to the shutdown of two (2) Massachusetts facilities owned and operated by The Newark Group Inc. Thirty seven (37) tons per year of NO_x ERCs were created and banked from the shutdown of Natick Paperboard, 90 North Main Street, Natick and twenty two (22) tons per year of NO_x ERCs were created and banked from the shutdown of Haverhill Paperboard, 100 South Kimball Street, Haverhill. ERCs in the Massachusetts Rate ERC Bank shall revert to the state to be retired for the benefit of the environment if they have not been used by midnight of the date ten years from the date of MassDEP approval, or April 7, 2020.

In addition, the Permittee entered into an agreement on April 4, 2013 to purchase 135 tons per year of rate-based NO_x Emission Reduction Credits (ERCs) from Osram Sylvania Inc. These ERCs were created and banked on March 11, 2004 by the Rhode Island Department of Environmental Management, Office of Air Resources (OAR), pursuant to the provisions of the State of Rhode Island Air Pollution Control Regulation No. 9, due to the shutdown of a number of operations at Osram Sylvania Inc., 1193 Broad Street, Central Falls, Rhode Island. In accordance with the Memorandum of Understanding by and between the State of Rhode Island Department of Environmental Management and the Commonwealth of Massachusetts Department of Environmental Protection on the Interstate Trading of NO_x Emission Reduction Credits (ERCs), dated April 2005, NO_x ERCs generated in the State of Rhode Island may be used in the Commonwealth of Massachusetts to meet emission offset requirements set forth in 310 CMR 7.00: Appendix A. The Osram Sylvania Inc. facility is located in the Ozone Transport Region. Unlike Massachusetts ERCs in the Rate ERC Bank, Rhode Island ERCs are not subject to retirement.

In total, the Permittee has entered into agreements to purchase 194 tons of rate-based NO_x ERCs. Since 183 tons per year of NO_x emission offsets will be used to offset NO_x emissions from the Facility, 183 tons per year of NO_x ERCs in the Rate ERC Bank must be retired at the

approved annual offset rate regardless of the Facility's annual actual emissions. ERCs utilized as offsets are considered "used" commencing with start-up of the Facility. If the Facility start-up occurs after April 7, 2020, then the Permittee shall not use the abovementioned Newark Group ERCs.

Appendix A requires the Permittee to demonstrate, and MassDEP to concur, that the benefits of the proposed project significantly outweigh the environmental and social costs imposed as a result of the project's location, construction or modification (310 CMR 7.00: Appendix A (8)(b)). This demonstration requires analysis of alternative sites, sizes, production processes, and environmental control techniques. The Application contains the details of the required demonstration, a summary of which is provided here.

Alternative Site Evaluation

The Permittee's site selection process focused on sites with shuttered or challenged coal and/or oil fired electric generating facilities. The sites where these smaller, older oil and coal fired electric generating facilities presently operate also typically offer ready access to transmission, available water supply, and proximity to electric load. Developing a natural gas fired facility at these challenged sites offers numerous and substantial benefits to the State and local community. In addition to retention of jobs and tax revenues, when an older fossil fuel fired electric generating facility is replaced by a state of the art natural gas fired electric generating facility with sophisticated emissions controls, significant decreases in sulfur dioxide (SO₂), CO₂, NO_x, particulates, and emissions of other air pollutants are realized. Moreover, while site contamination associated with an older coal or oil fired electric generating facility may go unaddressed or, at least, may not get addressed in a timely manner when a facility is simply shut down, the Permittee will address contamination and other environmental liability issues as an integral part of the plans to construct and operate the proposed Facility.

The Salem site presents a significant number of attributes that satisfy the Permittee's location, environmental and community criteria set forth above. For example:

- The existing Salem Harbor Station facility was considered to be one of the "Filthy Five" electric generation plants in Massachusetts, with a long history of environmental challenges. Indeed, construction of the proposed Facility on the landward portion of the site will afford the Permittee the opportunity to clean up the portion of the site currently occupied by the soon-to-be shutdown existing Salem Harbor Station facility, and return that valuable waterfront land to productive use, consistent with State law. Having entered commercial operation as an electric generating facility in 1951, the Salem Harbor site has a long history as a site for electricity generation.
- The existing Salem Harbor Station facility has been required by ISO - New England to operate for reliability purposes through May 2014, offering the Permittee the opportunity to minimize any gaps in electricity generation beyond that date through the development and permitting of the new state of the art Facility.

- The site is nearby (less than two miles from) a natural gas pipeline facility, namely the Maritimes and Northeast pipeline.
- There is strong local support for the continuation of electric generation on the site as a means of maximizing tax revenues and local employment. The Mayor, other city officials, and state senators and representatives, have been supporters of continued presence of electric generation at the site, in general, and particularly of the development of this Facility.
- There is support for potential reuse of the site as demonstrated by (1) the 2011 decision to use Regional Greenhouse Gas Initiative (RGGI) funds to supplement the City of Salem's tax revenues for an eight-year period; (2) funding of the Salem Site Reuse Study by the Massachusetts Clean Energy Center; and (3) the enactment of Chapter 209 of the Acts of 2012 and the establishment of the Salem Harbor Power Station Plan Revitalization Task Force.
- Permitting of the proposed Facility is expected given city and state support of the electric power generation/site reuse concept, as well as compatibility of the proposed Facility development with local zoning requirements.
- The site is located in close proximity to the electric grid (National Grid system) and a water supply.
- The 65-acre site is sufficiently large to accommodate the proposed Facility and enable further redevelopment opportunities.
- The site offers the Permittee the opportunity to significantly reduce air, water supply, wastewater, noise, visual, and other impacts relative to the existing Salem Harbor Station facility.
- The absence of new electric generation in the Northeastern Massachusetts/Boston (NEMA/Boston) load zone. Indeed, it has been nearly a decade since any significant new electric generation, i.e. Mystic 8 and 9, has been added in NEMA/Boston. Over the course of these last ten years, there have been several unit retirements and still more retirements are anticipated, while load in the NEMA/Boston area is not expected to decrease.
- The construction of the proposed Facility, along with demolition of the existing facility and attendant remediation of the site, will bring a significant number of jobs over the course of the next several years. The Permittee expects that approximately 30-40 permanent employees will be needed to operate the proposed Facility, assuring that operations related employment at the Salem Harbor Station site will continue beyond the June 1, 2014 retirement date of the existing facility.

- The demolition of the existing facility and remediation of the site will enable future use of the remainder of the site for a variety of marine industrial purposes, thereby providing opportunities to revitalize this valuable waterfront area.

In sum, the site satisfied the Permittee's overall site selection objectives, as well as most, if not all, of its location, environmental and community criteria. Accordingly, the site was deemed to be superior to the alternative sites analyzed by the Permittee.

Alternative Project Sizes, Production Processes, and Environmental Control Techniques Evaluation

The Permittee considered positioning the proposed Facility on the portion of the site located outside of Chapter 91 jurisdiction. However, the Permittee concluded that the approximately 14.5 acre, irregularly shaped, non-Chapter 91 portion of the site is not large enough to accommodate the proposed Facility.

The Permittee also considered a wet-cooling system as a design alternative for the proposed Facility. However, wet cooling was not considered to be a reasonable option because it would result in greater impacts to Salem Harbor from withdrawal/discharge in terms of water quality and impingement/entrainment versus the air cooled condenser option chosen.

The Permittee also considered a "dual fuel" alternative in which the proposed Facility could run on either natural gas or diesel fuel oil. This alternative was considered not to be a reasonable alternative due to intense local opposition to diesel fuel oil at the site and the potential increased environmental risks (both to Salem Harbor and on and near the site) associated with fuel delivery to/use on the site.

State and Regional Project Benefits

The Permittee has documented that electric generation that will be provided by the proposed Facility is essential to ensure reliability in the NEMA/Boston load zone. The need for reliability of the electric power grid clearly constitutes an overriding public benefit.

In addition, the public benefit served by the redevelopment of the site represented by the proposed Facility has been expressly identified in recently enacted special legislation. Section 42 of Chapter 209 of the Acts of 2012 expressly provides:

"There shall be a plant revitalization task force established to implement a plan, adopt rules and regulation and recommend necessary legislative action to ensure the full deconstruction, remediation and redevelopment or repowering of the Salem Harbor Station by December 31, 2016."

The proposed Facility achieves all of the legislative goals of full demolition, remediation and redevelopment of the site within the legislatively prescribed deadline of December 31, 2016. It is difficult to conceive of any other project that could implement a plan for redevelopment of the site by December 31, 2016.

The proposed Facility also serves the Commonwealth's interest in developing renewable energy sources. That is, the quick-start technology designed into the proposed Facility facilitates and supports the development of wind generation. Because wind power is an intermittent resource, it is especially important for the region to be able to rely on clean and cost effective quick-start electric generation during those periods when wind output is not available. While a number of quick-start "peaking" facilities have recently been sited in New England, the proposed state of the art quick-start technology at the proposed Facility will be more efficient and will have fewer emissions than the peaking units which presently fill the gap when wind is unavailable.

While the proposed Facility clearly fulfills the need for electricity reliability, the state of the art natural gas fired emission units also offer significant air quality benefits. An analysis prepared for the Permittee by Charles River Associates concludes that because the proposed Facility "displaces other, less efficient generation on the New England Grid, operation of [the Facility] reduces annual regional air emissions by approximately 457,626 tons (1.3%) of CO₂, 984 tons (10%) of NO_x, and 888 tons (8%) of SO₂."¹

The important air quality improvements resulting from the proposed Facility are also recognized in the Massachusetts Clean Energy and Climate Action Plan for 2020, which estimates that the displacement of the former Salem Harbor Station and Somerset Station facilities by natural gas fired power plants would result in a net 1.2 million metric ton reduction in Greenhouse Gases (CO_{2e}) in 2020.²

Local Project Benefits

Without the proposed Facility, the upcoming retirement of the Salem Harbor Station facility would result in a significant loss of tax revenues for the City of Salem. In fiscal year 2010, former owner and operator of Salem Harbor Station, Dominion Energy Salem Harbor LLC, paid \$4.75 million in taxes, making the facility the largest contributor of tax revenue in the City of Salem. The \$4.75 million included a negotiated usage fee of \$1.75 million, and property taxes of \$3 million, which included \$800,000 attributable to the land. The proposed Facility will help ensure that tax revenues associated with the site are maintained, thus not adversely affecting the City's budget and it will permit dollars from the RGGI Trust Account to be redirected away from Salem and to other environmentally beneficial uses.

In addition, the proposed Facility will result in opportunities for public enjoyment of the waterfront, consistent with the site's location in a Designated Port Area. Currently, there is no public access to the waterfront on the site. In contrast, as a result of the proposed Facility, the public will have the opportunity to access paths on the Derby Street (residential) side of the site, as well as linear access to view Salem Harbor. In addition, the demolition and remediation efforts to be undertaken by the Permittee will enable future development options for the rest of the site that could even further enhance public access to and enjoyment of the waterfront.

Minimization of Environmental and Social Costs

The Permittee has committed to reduce and/or mitigate any environmental and social impacts as a result of development of the site. The proposed Facility will minimize emissions and will not cause or contribute to violation of any applicable air quality standard, through use of only clean burning natural gas as fuel, advanced pollution control equipment, and highly efficient combustion turbines. As a result, emissions from the proposed Facility will be amongst the lowest of any fossil fuel fired electric generating facility in the United States.

MassDEP acknowledges that there will be environmental and social costs. There will be new emissions to the ambient air which will be minimized through addition of control technology and the purchase of NO_x emission offsets. Further, the impacts to the ambient air from the project are well within the standards and guidelines designed to protect public health.

Based upon review of the detailed demonstration provided by the Permittee in the Application, MassDEP finds that the benefits of this project significantly outweigh this project's environmental and social costs.

Notes:

1. “Analysis of the Impact of Salem Harbor Repowering on New England Air Emissions” dated November 21, 2012, p. 1, included in Appendix C to the Draft Environmental Impact Report, EEA# 14937; values updated per June 10, 2013 letter to MassDEP, Attachment 4.
2. “Massachusetts Clean Energy and Climate Plan for 2020, A report to the Great and General Court pursuant to the Global Warming Solutions Act (Chapter 298 of the Acts of 2008, and as codified at M.G.L. c. 21N)” dated December 29, 2010, submitted by Secretary of Energy and Environmental Affairs Ian A. Bowles, p. 44.

3. AIR QUALITY IMPACT ANALYSIS

The EPA has developed National Ambient Air Quality Standards (NAAQS) for six air contaminants known as criteria pollutants for the protection of public health and welfare. These criteria pollutants are Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Particulate Matter (PM), Carbon Monoxide (CO), Ozone (O₃), and Lead (Pb). The NAAQS include both primary and secondary standards of different averaging periods, which protect public health and public welfare, respectively.

One of the basic goals of federal and state air pollution control regulations is to ensure that ambient air quality, including background, existing, and new sources, is in compliance with the NAAQS. To identify new pollution sources with the potential to significantly alter ambient air quality, the EPA and MassDEP have adopted significant impact levels (SILs) for the criteria pollutants except O₃ and Pb. New major sources (or major modifications of existing major sources) are required to perform an air quality dispersion modeling analysis to predict air quality impacts of the new (or modified) source in comparison to the SILs. If the predicted impact of the new or modified source is less than the SIL for a particular pollutant and averaging period, then the impact is considered “insignificant” for that pollutant and averaging period. However, if the predicted impact of the new or modified source is equal to or greater than the SIL for a particular

pollutant and averaging period, then further impact evaluation is required. This additional evaluation must include measured background levels of pollutants, and emissions from both the proposed new (or modified) source and existing interactive sources (cumulative dispersion modeling).

General Conditions

Dispersion modeling analyses were performed to assess the proposed Facility’s air impacts of criteria air pollutants and air toxics against applicable SILs, NAAQS, and MassDEP’s Allowable Ambient Levels (AALs) and Threshold Effects Exposure Limits (TELEs) Guidelines for air toxics. These analyses were conducted in accordance with EPA’s “Guideline on Air Quality Models” (November 2005) and MassDEP’s “Modeling Guidance of Significant Stationary Sources of Air Pollution” (June 2011) and as described in the Air Quality Modeling Protocol submitted to MassDEP on August 29, 2012. The EPA-recommended AERMOD model (current AERMOD version 12060, AERMAP version 11103) was used to perform the dispersion modeling. Dispersion modeling was conducted in a manner that evaluated worst case operating conditions in an effort to predict the highest impact for each pollutant and averaging period.

The dispersion modeling was conducted using five years (2006 through 2010) of surface data collected by the National Weather Service (NWS) from the Logan Airport Station in Boston, Massachusetts and the corresponding upper air data from Gray, Maine. These stations are the closest NWS Stations and most representative of the Salem area. AERMET (version 11059), AERMINUTE (version 11059), and AERSURFACE were employed to prepare the meteorological files. Land use within a 3 kilometer radius of the proposed Facility was characterized as rural and water covered (approximately 64 percent). Therefore, rural dispersion coefficients were used in the dispersion modeling. The modeling analyses included the two combustion turbine units, auxiliary boiler, emergency generator and fire pump engines, and the auxiliary cooling tower, all operating simultaneously. Three GE combustion turbine operating loads (46, 75, and 100 percent loads), including a worst case combustion turbine start-up condition, were modeled. Table 1 presents the maximum predicted ambient air quality impact concentrations for the proposed Facility. The proposed Facility was predicted to have maximum ambient air quality impact concentrations below SILs for all pollutants and averaging periods, except for 1-Hour NO₂ and 24-Hour PM_{2.5}.

Table 1					
Criteria Pollutant	Averaging Period	Primary NAAQS (ug/m³)	Secondary NAAQS (ug/m³)	Significant Impact Level (ug/m³)	Maximum Predicted Facility Impact (ug/m³)
NO ₂	Annual ⁽¹⁾	100	Same	1	0.4
	1-Hour ⁽²⁾	188	None	7.5	41.8
SO ₂	Annual ^(1,3)	80	None	1	0.03
	24-Hour ^(3,4)	365	None	5	0.7
	3-Hour ⁽⁴⁾	None	1,300	25	1.1
	1-Hour ^(5,6)	196	None	7.8	1.0
PM _{2.5}	Annual ⁽⁷⁾	12	Same	0.3	0.12
	24-Hour ⁽⁸⁾	35	Same	1.2	3.2

Table 1					
Criteria Pollutant	Averaging Period	Primary NAAQS (ug/m³)	Secondary NAAQS (ug/m³)	Significant Impact Level (ug/m³)	Maximum Predicted Facility Impact (ug/m³)
PM ₁₀	24-Hour ⁽⁹⁾	150	Same	5	4.3
CO	8-Hour ⁽⁴⁾ 1-Hour ⁽⁴⁾	10,000 40,000	None None	500 2,000	112.4 313.6
O ₃	8-Hour ⁽¹⁰⁾	147	Same	NA	NA
Pb	3-Month ⁽¹⁾	0.15	Same	NA	< 0.00016

Table 1 Notes:

1. Not to be exceeded.
2. Compliance based on 3 year average of the 98th percentile of the daily maximum 1 hour average at each monitor within an area.
3. EPA has indicated that the 24 hour and annual average primary standards for SO₂ will be revoked.
4. Not to be exceeded more than once per year.
5. Compliance based on 3 year average of 99th percentile of the daily maximum 1 hour average at each monitor within an area.
6. The 1 hour SO₂ standard was effective as of August 23, 2010.
7. Compliance based on 3 year average of weighted annual mean PM_{2.5} concentrations at community oriented monitors.
8. Compliance based on 3 year average of 98th percentile of 24 hour concentrations at each population oriented monitor within an area.
9. Not to be exceeded more than once per year on average over 3 years.
10. Compliance based on 3 year average of fourth highest daily maximum 8 hour average ozone concentrations measured at each monitor within an area.

Table 1 Key:

NAAQS = National Ambient Air Quality Standards
EPA = United States Environmental Protection Agency
NO₂ = Nitrogen Dioxide
SO₂ = Sulfur Dioxide
PM_{2.5} = Particulate Matter less than or equal to 2.5 microns in diameter
PM₁₀ = Particulate Matter less than or equal to 10 microns in diameter
CO = Carbon Monoxide
O₃ = Ozone
Pb = Lead
ug/m³ = micrograms per cubic meter
NA = Not Applicable
< = less than

Cumulative Dispersion Modeling

Since dispersion modeling predicted maximum impact concentrations above SILs for 1 Hour NO₂ and 24-Hour PM_{2.5}, cumulative impact modeling was performed for these pollutants with the same pollutant emissions from existing interactive sources and measured background levels to compare against the NAAQS for 1-Hour NO₂ and 24-Hour PM_{2.5}. Background concentrations were obtained from MassDEP’s Lynn monitoring location, approximately 5.9 miles southwest of the Facility. The existing interactive sources in Massachusetts nearby the Facility considered in the cumulative modeling were: a) General Electric Lynn and Wheelabrator Saugus for 1-Hour NO₂ and 24-Hour PM_{2.5}; and b) Rousselot Peabody, Peabody Municipal Light, and Marblehead Municipal Light for 1-Hour NO₂. Table 2 shows the cumulative impacts. The results of the cumulative impact analysis show that under no condition did the proposed Facility’s worst case emissions in combination with emissions from the existing interactive sources plus measured background levels result in concentrations which exceeded the applicable NAAQS.

Table 2					
Criteria Pollutant	Averaging Period	Cumulative Impact, Facility Plus Existing Sources⁽²⁾ (ug/m³)	Background (ug/m³)⁽¹⁾	Total Impact Plus Background (ug/m³)	Primary NAAQS (ug/m³)
NO ₂	1-Hour	83.7 ⁽³⁾	82.3	166.0	188
PM _{2.5}	24-Hour	3.5	18.9	22.4	35

Table 2 Notes:

1. Background concentrations are based on the measured values from 2010 through 2012. Short term background concentrations for 24-Hour PM_{2.5} and 1-Hour NO₂, are the average of the 98th percentile values over the 3 years (2010-2012). These assumptions are consistent with the form of the NAAQS for the pollutant.
2. Consistent with EPA modeling guidance for NAAQS compliance assessments, impact concentrations are based on the 5 year average of the 1st highest values occurring in each year for the 24-Hour PM_{2.5} concentration, and the 5 year average of the 8th highest daily maximum concentrations occurring in each year for the 1-Hour NO₂ concentration.
3. The modeled cumulative impacts represent an EPA-approved Tier 2 approach reflecting an 80 percent conversion of NO_x emissions to NO₂ in the ambient air.

Table 2 Key:

NAAQS = National Ambient Air Quality Standards
NO₂ = Nitrogen Dioxide
PM_{2.5} = Particulate Matter less than or equal to 2.5 microns in diameter
ug/m³ = micrograms per cubic meter

Air Toxics Analysis

MassDEP has established health based ambient air guidelines for a variety of chemicals (air toxics). These air guidelines establish two limits for each chemical listed: an AAL, which is

based on an annual average concentration; and a TEL, which is based on a 24-hour time period. In general, AALs are lower than TELs, and represent the concentration associated with a one in one million excess lifetime cancer risk, assuming a lifetime of continuous exposure to that concentration. For chemicals that do not pose cancer risks, the AAL is equal to the TEL.

Table 3 presents the projected maximum impacts for each air toxic that will potentially be emitted by the proposed Facility for which an AAL or TEL has been established. Impacts are based on the worst case emission scenarios predicted by AERMOD. As shown in Table 3, the proposed Facility's maximum predicted ambient air quality impact concentrations were significantly below applicable AALs and TELs for all of the air toxics modeled.

Table 3			
Pollutant	Averaging Period	AAL/TEL (ug/m³)	Maximum Predicted Facility Impact (ug/m³)
Acetaldehyde	24-Hour (TEL)	2	0.053708
	Annual (AAL)	0.5	0.000775
Ammonia	24-Hour (TEL)	100	1.093673
	Annual (AAL)	100	0.034497
Benzene	24-Hour (TEL)	1.74	0.080104
	Annual (AAL)	0.12	0.000591
1,3-Butadiene	24-Hour (TEL)	1.20	0.002035
	Annual (AAL)	0.003	0.000019
o-Dichlorobenzene	24-Hour (TEL)	81.74	0.000047
	Annual (AAL)	81.74	0.000006
p-Dichlorobenzene	24-Hour (TEL)	122.61	0.000047
	Annual (AAL)	0.18	0.000006
Ethylbenzene	24-Hour (TEL)	300	0.012962
	Annual (AAL)	300	0.000409
Formaldehyde	24-Hour (TEL)	2.0	0.203990
	Annual (AAL)	0.8	0.005265
Naphthalene	24-Hour (TEL)	14.25	0.009739
	Annual (AAL)	14.25	0.000067
Propylene Oxide	24-Hour (TEL)	6	0.334015
	Annual (AAL)	0.3	0.002126
Sulfuric Acid	24-Hour (TEL)	2.72	0.053184
	Annual (AAL)	2.72	0.001841
Toluene	24-Hour (TEL)	80	0.083392
	Annual (AAL)	20	0.001857
Xylenes	24-Hour (TEL)	11.80	0.047138
	Annual (AAL)	11.80	0.000942
Arsenic	24-Hour (TEL)	0.003	0.000012
	Annual (AAL)	0.0003	0.000001
Beryllium	24-Hour (TEL)	0.001	0.000000
	Annual (AAL)	0.0004	0.0000001

Table 3			
Pollutant	Averaging Period	AAL/TEL (ug/m³)	Maximum Predicted Facility Impact (ug/m³)
Cadmium	24-Hour (TEL)	0.003	0.000044
	Annual (AAL)	0.001	0.000006
Chromium (total)	24-Hour (TEL)	1.36	0.001137
	Annual (AAL)	0.68	0.000013
Chromium (hexavalent)	24-Hour (TEL)	0.003	0.000205
	Annual (AAL)	0.0001	0.000002
Copper	24-Hour (TEL)	0.54	0.00003
	Annual (AAL)	0.54	0.00000
Lead ⁽¹⁾	24-Hour (TEL)	0.14	0.00009
	Annual (AAL)	0.07	0.000003
Mercury (elemental)	24-Hour (TEL)	0.14	0.00001
	Annual (AAL)	0.07	0.000001
Nickel	24-Hour (TEL)	0.27	0.00021
	Annual (AAL)	0.18	0.00001
Selenium	24-Hour (TEL)	0.54	0.00002
	Annual (AAL)	0.54	0.0000002
Vanadium	24-Hour (TEL)	0.27	0.00009
	Annual (AAL)	0.27	0.00001

Table 3 Notes:

1. Most air toxics do not have a NAAQS, with the exception of lead.

Table 3 Key:

AAL = Allowable Ambient Limit
TEL = Threshold Effects Exposure Limit
ug/m³ = micrograms per cubic meter

Preconstruction Monitoring Analysis

As described in the “Cumulative Dispersion Modeling” section above, ambient background monitoring data from MassDEP’s Lynn monitoring site for the three (3) year period of 2010 through 2012 were used to characterize criteria pollutant ambient air impacts. PSD regulations allow proposed sources to use existing monitoring data in lieu of PSD preconstruction monitoring requirements for a pollutant if the source can demonstrate that its ambient air impact is less than a de minimis amount (also called a significant monitoring concentration or SMC) as specified in those regulations. As shown in Table 4 below, dispersion modeling conducted by the Permittee predicted maximum proposed Facility impact concentrations well below corresponding SMC levels for all pollutants for which SMCs exist.

Table 4			
Pollutant	Averaging Period	SMC (ug/m³)	Maximum Predicted Facility Impact (ug/m³)
NO ₂	Annual	14	0.4
SO ₂	24-Hour	13	0.7
PM ₁₀	24-Hour	10	4.3
CO	8-Hour	575	112.4

Table 4 Key:

SMC = Significant Monitoring Concentration
ug/m³ = micrograms per cubic meter

EPA had also established an SMC for PM_{2.5} but this SMC was remanded by the United States Court of Appeals for the DC Circuit on January 22, 2013 (No. 10-1413, Sierra Club v. EPA). On March 4, 2013, the EPA Office of Air Quality Planning and Standards issued guidance to applicants and regulators with regard to the ramifications of the January 22, 2013 Appeals Court decision. The pertinent excerpt of this recent EPA guidance is as follows:

“As a result of the Court’s decision, Federal PSD Permits issued henceforth by either the EPA or a delegated state permitting authority pursuant to 40 CFR 52.21 should not rely on the PM_{2.5} SMC to allow applicants to avoid compiling air quality monitoring data for PM_{2.5}. Accordingly, all applicants requesting a federal PSD permit, including those having already applied for but have not yet received the permit, should submit ambient PM_{2.5} monitoring data in accordance with the Clean Air Act requirements whenever either direct PM_{2.5} or any PM_{2.5} precursor is emitted in a significant amount. In lieu of applicants setting out PM_{2.5} monitors to collect ambient data, applicants may submit PM_{2.5} ambient data collected from existing monitoring networks when the permitting Authority deems such data to be representative of the air quality in the area of concern for the year preceding receipt of the application. We believe that applicants will generally be able to rely on existing representative monitoring data to satisfy the monitoring data requirement.”

The Lynn monitoring site, located approximately 5.9 miles to the southwest of the proposed Facility, is representative of the proposed Facility site due to its proximity. Use of the data from this monitoring site is conservative for the following reasons:

- a) Lynn is a more industrialized and densely populated area than the proposed Facility site, particularly without the influence of the existing Salem Harbor Station after its shutdown prior to when the proposed Facility commences operation. The proposed Facility site is located adjacent to Salem Harbor, a significantly large water body where potential emission sources are more limited. The Lynn monitoring site is located closer to the metropolitan Boston area than the proposed Facility site. Any potentially elevated ambient background pollutant concentrations from mobile and stationary emission sources located in and around the Boston metropolitan area that may be transported to the proposed Facility site via predominant winds from the south or southwest, typically pass

the Lynn monitoring location and are therefore represented in the measurement data collected at the Lynn monitoring site.

b) The General Electric Lynn and Wheelabrator Saugus facilities, which have been identified by MassDEP as the only two major industrial emission sources to be modeled cumulatively with the proposed Facility emissions for 24-Hour $PM_{2.5}$, are located slightly less than 2 miles from the Lynn monitoring site but are located about 7 miles from the proposed Facility site. Therefore, the cumulative modeling compliance demonstration, which includes both the background ambient concentrations and impacts from the interactive existing major sources likely double counts the contribution of these sources and therefore, provides additional conservatism to the required modeling results by potentially overestimating cumulative impact concentrations. This is particularly significant given that these two major sources are located to the south-southwest of the monitoring site, which means that they could potentially influence the monitoring site concentrations during winds coming from the south or southwest, the predominant wind directions in this area.

For the reasons set forth above, in accordance with the PSD regulations and recent EPA guidance, MassDEP has determined that preconstruction monitoring is not required.

Justification for Using Significant Impact Levels (SILs) for $PM_{2.5}$

Despite the fact that the PSD regulations dealing with SILs for $PM_{2.5}$ were partially vacated and remanded (at EPA's request) in the January 22, 2013 Appeals Court decision, the use of the $PM_{2.5}$ SILs is still valid in certain circumstances in which ambient background concentrations are relatively low. EPA did not concede that it lacked authority to promulgate SILs and the court found that it was not necessary to address the question of whether EPA had such authority. In fact, the SILs were vacated and remanded in only PSD sections 40 CFR 51.166(k)(2) and 52.21(k)(2) but were not vacated in 40 CFR 51.165(b)(2). This is most likely because the text of this latter regulation does not exempt a source from ambient air quality analysis but states that if a source located in an attainment area exceeds a SIL in a nonattainment area (or predicted nonattainment situation), it is deemed to have contributed to or caused a violation of a NAAQS.

Key examples in the Appeals Court decision supporting the vacature and remand involved cases in which the ambient air quality background is very close to the NAAQS. This is not the case in the Salem region where the $PM_{2.5}$ background is only slightly over half of the NAAQS, 18.9 ug/m^3 vs. 35 ug/m^3 . Therefore, use of the prior $PM_{2.5}$ SILs is appropriate in the case of the ambient air quality impact analysis for the proposed Facility because the background concentrations plus the SILs still leave a significant margin before the NAAQS would come close to being jeopardized.

Use of the prior $PM_{2.5}$ SILs is also consistent with the recent EPA guidance on this matter which states ¹:

- The EPA does not interpret the Court's decision to preclude the use of SILs for $PM_{2.5}$ entirely but additional care should be taken by permitting authorities in how they apply

those SILs so that the permitting record supports a conclusion that the source will not cause or contribute to a violation of the PM_{2.5} NAAQS.

- PSD permitting authorities have the discretion to select PM_{2.5} SIL values if the permitting record provides sufficient justification for the SIL values that are used and the manner in which they are used to support a permitting decision.
- The PM_{2.5} SIL values in the EPA's regulations may continue to be used in some circumstances if permitting authorities take care to consider background concentrations prior to using these SIL values in particular ways.
- Because of the Court's decision vacating the PM_{2.5} SMC, all applicants for a federal PSD permit should include ambient PM_{2.5} monitoring data as part of the air quality impacts analysis. If the preconstruction monitoring data shows that the difference between the PM_{2.5} NAAQS and the monitored PM_{2.5} background concentrations in the area is greater than the EPA's PM_{2.5} SIL value, then the EPA believes it would be sufficient in most cases for permitting authorities to conclude that a proposed source with a PM_{2.5} impact below the PM_{2.5} SIL value will not cause or contribute to a violation of the PM_{2.5} NAAQS and to, therefore, forego a more comprehensive cumulative modeling analysis for PM_{2.5}.
- As part of a cumulative analysis, the applicant may continue to show that the proposed source does not contribute to an existing violation of the PM_{2.5} NAAQS by demonstrating that the proposed source's PM_{2.5} impact does not significantly contribute to an existing violation of the PM_{2.5} NAAQS. However, permitting authorities should consult with the EPA before using any of the SIL values in the EPA's regulations for this purpose (including the PM_{2.5} SIL value in section 51.165(b)(2), which was not vacated by the Court).

Notes:

1. EPA, Office of Air Quality Planning and Standards, "Circuit Court Decision on PM_{2.5} Significant Impact Levels and Significant Monitoring Concentration – Questions and Answers", March 4, 2013.
<http://www.epa.gov/nsr/documents/20130304qa.pdf>

4. ACCIDENTAL RELEASE MODELING OF AQUEOUS AMMONIA (NH₃)

Aqueous NH₃ will be used as the reducing agent in the proposed Facility's SCR system to control NO_x emissions. A solution of aqueous NH₃ (19% solution) will be stored onsite in an above-ground 34,000-gallon single-walled steel tank located north of the building structures. The tank, as well as NH₃ transfer pumps, valves, and piping will be contained within a concrete dike designed to contain 110 percent of the total volume of the tank.

In order to minimize the exposed surface area of any aqueous NH₃ that enters the containment area, passive evaporative controls (polyethylene balls or equivalent) will be utilized to reduce the surface area by 90 percent. In order to further mitigate the potential impacts of an

accidental NH₃ release, the entire tank and containment area will be located within an enclosure with walls that will be fully sealed and ventilation provided by roof vents.

The aqueous NH₃ storage tank will be constructed in accordance with the Massachusetts Department of Public Safety requirements for storage tanks greater than 10,000 gallons containing material other than water. The dike wall and enclosure surrounding the tank will decrease the risk of damage to the tank caused by accidental vehicle contact.

Transfer from NH₃ delivery trucks to the storage tank will take place within a contained concrete storage unloading pad with drainage design such that any spills during NH₃ delivery will drain into the containment area. Delivery trucks will be required to have fast-acting shutoff valves in the unlikely event that a leak or other problem should arise. A hose from the top of the tank connected back to the truck will return displaced vapor to the truck, or an equivalent method for control of transfer losses will be used.

The storage tank will be equipped with level monitoring instrumentation that will be continuously monitored in the proposed Facility's control room. In the event that the tank level approaches an overflow condition during filling, a high level alarm will sound, initiating an immediate response to the situation. In addition, NH₃ sensors in the enclosure will alert plant staff and prevent the accumulation of significant amounts of NH₃ in the containment area.

Ammonia in aqueous solution is volatile, and the accidental release of this material would result in some release of NH₃ to the ambient air. Therefore, a worst case accidental release scenario was performed to evaluate the potential health impacts of such a release. This scenario assumed a release of the entire contents of the tank into the containment area, and conservatively evaluated the air quality impacts of such a release at the nearest projected controlled access perimeter (PCAP), approximately 230 feet from the NH₃ storage area. The NH₃ emissions resulting from this hypothetical worst case release scenario were calculated using the Area Locations of Hazardous Atmospheres model. This model was developed by EPA and the National Oceanic and Atmospheric Administration, and is included as a prescribed technique under the EPA Risk Management Program (RMP) guidance.

In order to conservatively evaluate offsite consequences of an NH₃ release, the AERMOD dispersion model used for evaluation of air quality impacts from the exhaust stacks was used to determine maximum NH₃ concentrations at receptors at or near the PCAP, evaluated in terms of the American Industrial Hygiene Association (AIHA) Emergency Response Planning Guideline Level 1 (ERPG-1) of 25 parts per million (ppm) by volume, and the ERPG-2 of 150 ppm by volume. ERPG-1 is defined as the maximum airborne concentration below which nearly all individuals could be exposed to for up to one hour without experiencing either mild transient health effects and/or a clearly defined objectionable odor. ERPG-2 is defined as the maximum airborne concentration which it is believed that nearly all individuals could be exposed to for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair the ability to take self directed protective action.

The results of the AERMOD model indicate that in the event of a hypothetical worst case release, the NH₃ concentrations would be less than the ERPG-1 level of 25 ppm by volume at all locations outside of the PCAP. Thus, the NH₃ concentrations at all locations outside of the PCAP

would be well below the ERPG-2 level of 150 ppm by volume. Table 5 presents the results of the predicted 1 hour maximum concentrations of NH₃:

Table 5				
Location	Distance from NH₃ Storage Enclosure (Feet)	ERPG-1	ERPG-2	NH₃ Concentration (Maximum Hourly Value, ppm)
Power Plant North PCAP	230	25	150	20.2
Power Plant West PCAP	340	25	150	13.1
Power Plant East PCAP	450	25	150	4.4
Nearest Residence (Fort Avenue)	570	25	150	6.7
Salem Essex Sewerage District (SESD)	750	25	150	6.8

Table 5 Key:

PCAP = Projected Controlled Access Perimeter
ERPG-1 = Emergency Response Planning Guideline Level 1
ERPG-2 = Emergency Response Planning Guideline Level 2
NH₃ = Ammonia
ppm = parts per million by volume

In addition, Section 112(r) of the Clean Air Act and associated EPA regulations at 40 CFR Part 68 apply to owners or operators of stationary sources producing, processing, handling or storing toxic or flammable substances. The substances regulated under Section 112(r) and their threshold quantities are listed at Section 68.130 of 40 CFR Part 68. Although the proposed Facility will not store regulated substances above the threshold quantities, the general duty clause in Section 112(r)(1) applies:

“The owners and operators of stationary sources producing, processing, handling or storing hazardous substances have a general duty in the same manner and to the same extent as Section 654, Title 29 of the United States Code, to identify hazards which may result from accidental releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and minimize the consequences of accidental releases which do occur.”

The Permittee shall take all steps necessary to meet the general duty clause above.

4. EMISSION UNIT (EU) IDENTIFICATION

Each Emission Unit (EU) identified in Table 6 is subject to and regulated by this Plan Approval:

Table 6			
EU#	Description	Design Capacity	Pollution Control Device (PCD)
EU1	General Electric Model No. 107F Series 5 Combustion Turbine/Heat Recovery Steam Generator Including Duct Burner	2,449 MMBtu/hr, HHV (energy input) 346 MW (electric power output)	Dry Low NO _x Combustors (PCD1) Selective Catalytic Reduction (PCD2) CO Oxidation Catalyst (PCD3)
EU2	General Electric Model No. 107F Series 5 Combustion Turbine/Heat Recovery Steam Generator Including Duct Burner	2,449 MMBtu/hr, HHV (energy input) 346 MW (electric power output)	Dry Low NO _x Combustors (PCD4) Selective Catalytic Reduction (PCD5) CO Oxidation Catalyst (PCD6)
EU3	Cleaver Brooks Model No. CBND-80E-300D-65 or equivalent Auxiliary Boiler	80 MMBtu/hr, HHV (energy input)	Ultra Low NO _x Burners (PCD7)
EU4	Cummins Model No. DQFAA or equivalent Emergency Engine/Generator	7.4 MMBtu/hr, HHV (energy input) 1102 bhp (engine mechanical power output) 750 KW (generator electric power output)	None
EU5	Cummins Model No. CFP9E-F50 or equivalent Fire Pump Engine	2.7 MMBtu/hr, HHV (energy input) 371 bhp (engine mechanical power output)	None

Table 6 Key:

EU# = Emission Unit Number
No. = Number
MMBtu/hr = fuel heat input, million British thermal units per hour

HHV = higher heating value basis
bhp = mechanical engine rating, brake horsepower
MW = generator net electrical output, Megawatts
KW = generator net electrical output, Kilowatts
NO_x = Oxides of Nitrogen
CO = Carbon Monoxide

5. APPLICABLE REQUIREMENTS

A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The proposed Facility is subject to, and the Permittee shall ensure that the proposed Facility shall not exceed the Operational, Production, and Emission Limits as contained in Table 7 below, including footnotes:

Table 7			
EU#	Operational / Production Limit	Air Contaminant	Emission Limit
EU1, EU2	<p>Operation at \geq MECL, ⁽¹⁷⁾ excluding start-ups and shutdowns</p> <p>Fuel Heat Input Rate of each EU: \leq 2,449 MMBtu per hour, HHV</p> <p>Natural Gas shall be the only fuel of use.</p> <p>Fuel Heat Input of each EU: \leq 18,888,480 MMBtu, HHV per 12-month rolling period ⁽⁹⁾</p>	NO _x (no duct firing)	\leq 18.1 lb/hr ^(1, 2) \leq 0.0074 lb/MMBtu ⁽¹⁾ \leq 2.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.051 lb/MW-hr ^(1, 2, 10, 14) \leq 15.0 ppmvd @ 15% O ₂ or \leq 0.43 lb/MW-hr ⁽¹³⁾
		NO _x (duct firing)	\leq 18.1 lb/hr ^(1, 2) \leq 0.0074 lb/MMBtu ⁽¹⁾ \leq 2.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.055 lb/MW-hr ^(1, 2, 15) \leq 15.0 ppmvd @ 15% O ₂ or \leq 0.43 lb/MW-hr ⁽¹³⁾
		CO (no duct firing)	\leq 11.0 lb/hr ^(1, 2) \leq 0.0045 lb/MMBtu ⁽¹⁾ \leq 2.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.031 lb/MW-hr ^(1, 2, 10, 14)
		CO (duct firing)	\leq 11.0 lb/hr ^(1, 2) \leq 0.0045 lb/MMBtu ⁽¹⁾ \leq 2.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.033 lb/MW-hr ^(1, 2, 15)

Table 7			
EU#	Operational / Production Limit	Air Contaminant	Emission Limit
EU1, EU2	<p>Operation at \geq MECL, ⁽¹⁷⁾ excluding start-ups and shutdowns</p> <p>Fuel Heat Input Rate of each EU: \leq 2,449 MMBtu per hour, HHV</p> <p>Natural Gas shall be the only fuel of use.</p> <p>Fuel Heat Input of each EU: \leq 18,888,480 MMBtu, HHV per 12-month rolling period ⁽⁹⁾</p>	VOC (no duct firing), as Methane (CH ₄)	\leq 3.0 lb/hr ^(1, 2) \leq 0.0013 lb/MMBtu ⁽¹⁾ \leq 1.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.009 lb/MW-hr ^(1, 2, 10, 14)
		VOC (duct firing), as Methane (CH ₄)	\leq 5.4 lb/hr ^(1, 2) \leq 0.0022 lb/MMBtu ⁽¹⁾ \leq 1.7 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.016 lb/MW-hr ^(1, 2, 15)
		S in Fuel	\leq 0.5 grains/100 scf
		SO ₂ (no duct firing)	\leq 3.7 lb/hr ^(1, 2) \leq 0.0015 lb/MMBtu ⁽¹⁾ \leq 0.3 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.010 lb/MW-hr ^(1, 2, 10, 14)
		SO ₂ (duct firing)	\leq 3.7 lb/hr ^(1, 2) \leq 0.0015 lb/MMBtu ⁽¹⁾ \leq 0.3 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.011 lb/MW-hr ^(1, 2, 15)
		H ₂ SO ₄ (no duct firing)	\leq 2.3 lb/hr ^(1, 2) \leq 0.0010 lb/MMBtu ⁽¹⁾ \leq 0.1 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.007 lb/MW-hr ^(1, 2, 10, 14)
		H ₂ SO ₄ (duct firing)	\leq 2.3 lb/hr ^(1, 2) \leq 0.0010 lb/MMBtu ⁽¹⁾ \leq 0.1 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.008 lb/MW-hr ^(1, 2, 15)
		PM/PM ₁₀ /PM _{2.5} (no duct firing)	\leq 15.5 lb/hr ^(1, 2, 8) \leq 0.0088 lb/MMBtu ^(1, 8) \leq 0.044 lb/MW-hr ^(1, 2, 8, 10, 14)
		PM/PM ₁₀ /PM _{2.5} (duct firing)	\leq 15.5 lb/hr ^(1, 2, 8) \leq 0.0067 lb/MMBtu ^(1, 8) \leq 0.049 lb/MW-hr ^(1, 2, 8, 15)
		NH ₃ (no duct firing)	\leq 6.6 lb/hr ^(1, 2) \leq 0.0027 lb/MMBtu ⁽¹⁾ \leq 2.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.019 lb/MW-hr ^(1, 2, 10, 14)
		NH ₃ (duct firing)	\leq 6.6 lb/hr ^(1, 2) \leq 0.0027 lb/MMBtu ⁽¹⁾ \leq 2.0 ppmvd @ 15% O ₂ ⁽¹⁾ \leq 0.020 lb/MW-hr ^(1, 2, 15)
		Greenhouse Gases, CO _{2e}	\leq 825 lb/MW-hr ⁽¹¹⁾ \leq 895 lb/MW-hr ⁽¹⁶⁾

Table 7			
EU#	Operational / Production Limit	Air Contaminant	Emission Limit
EU1, EU2	<p>Operation at \geq MECL, ⁽¹⁷⁾ excluding start-ups and shutdowns</p> <p>Fuel Heat Input Rate of each EU: \leq 2,449 MMBtu per hour, HHV</p> <p>Natural Gas shall be the only fuel of use.</p> <p>Fuel Heat Input of each EU: \leq 18,888,480 MMBtu, HHV per 12-month rolling period ⁽⁹⁾</p>	Opacity	$<$ 5%, except 5% to $<$ 10% for \leq 2 minutes during any one hour ⁽⁵⁾
	<p>Operation at $<$ MECL during start-ups ^(3, 12)</p> <p>Start-up duration: \leq 45 minutes ^(3, 12)</p> <p>Natural Gas shall be the only fuel of use.</p>	NO _x	\leq 89 lb per event ^(4, 12)
		CO	\leq 285 lb per event ^(4, 12)
		VOC, as Methane (CH ₄)	\leq 23 lb per event ^(4, 12)
		S in Fuel	\leq 0.5 grains/100 scf
		SO ₂	\leq 2.0 lb per event ^(4, 12)
		H ₂ SO ₄	\leq 1.3 lb per event ^(4, 12)
		PM/PM ₁₀ /PM _{2.5}	\leq 7.3 lb per event ^(4, 8, 12)
		NH ₃	NA
		Opacity	$<$ 10% ^(5, 12)
	<p>Operation at $<$ MECL during shutdowns ^(3, 12)</p> <p>Shutdown duration: \leq 27 minutes ^(3, 12)</p> <p>Natural Gas shall be the only fuel of use.</p>	NO _x	\leq 10 lb per event ⁽¹²⁾
		CO	\leq 151 lb per event ⁽¹²⁾
		VOC, as Methane (CH ₄)	\leq 29 lb per event ⁽¹²⁾
		S in Fuel	\leq 0.5 grains/100 scf
		SO ₂	\leq 0.3 lb per event ⁽¹²⁾
		H ₂ SO ₄	\leq 0.2 lb per event ⁽¹²⁾
		PM/PM ₁₀ /PM _{2.5}	\leq 5.8 lb per event ^(8, 12)
		NH ₃	NA
		Opacity	$<$ 10% ^(5, 12)

Table 7			
EU#	Operational / Production Limit	Air Contaminant	Emission Limit
EU3	<p>Operation at \geq MECL ⁽¹⁸⁾</p> <p>Fuel Heat Input Rate: \leq 80 MMBtu per hour, HHV</p> <p>Natural Gas shall be the only fuel of use.</p> <p>Total Fuel Heat Input: \leq 525,600 MMBtu, HHV per 12-month rolling period ⁽⁹⁾</p>	NO _x	\leq 0.88 lb/hr ⁽¹⁾ \leq 0.011 lb/MMBtu ⁽¹⁾ \leq 9.0 ppmvd @ 3% O ₂ ⁽¹⁾
		CO	\leq 2.8 lb/hr ⁽¹⁾ \leq 0.035 lb/MMBtu ⁽¹⁾ \leq 47 ppmvd @ 3% O ₂ ⁽¹⁾
		VOC, as Methane (CH ₄)	\leq 0.4 lb/hr ⁽¹⁾ \leq 0.005 lb/MMBtu ⁽¹⁾ \leq 11.8 ppmvd @ 3% O ₂ ⁽¹⁾
		S in Fuel	\leq 0.5 grains/100 scf
		SO ₂	\leq 0.12 lb/hr ⁽¹⁾ \leq 0.0015 lb/MMBtu ⁽¹⁾ \leq 0.9 ppmvd @ 3% O ₂ ⁽¹⁾
		H ₂ SO ₄	\leq 0.009 lb/hr ⁽¹⁾ \leq 0.0001 lb/MMBtu ⁽¹⁾ \leq 0.05 ppmvd @ 3% O ₂ ⁽¹⁾
		PM/PM ₁₀ /PM _{2.5}	\leq 0.4 lb/hr ^(1,8) \leq 0.005 lb/MMBtu ^(1,8)
		Greenhouse Gases, CO _{2e}	\leq 119.0 lb/MMBtu
		Opacity	< 5%, except 5% to < 10% for \leq 2 minutes during any one hour ⁽⁵⁾
EU4	<p>\leq 300 hours of operation per 12-month rolling period</p> <p>Ultra Low Sulfur Diesel Fuel Oil shall be the only fuel of use.</p>	NO _x and VOC (NMHC as CH _{1.8}), Combined Total	\leq 11.60 lb/hr ⁽⁶⁾ \leq 4.8 gm/bhp-hr ⁽⁶⁾ \leq 6.4 gm/KW-hr ⁽⁶⁾
		CO	\leq 6.34 lb/hr ⁽⁶⁾ \leq 2.6 gm/bhp-hr ⁽⁶⁾ \leq 3.5 gm/KW-hr ⁽⁶⁾
		S in Fuel	\leq 0.0015% by weight
		SO ₂	\leq 0.011 lb/hr ⁽⁶⁾
		H ₂ SO ₄	\leq 0.0009 lb/hr ⁽⁶⁾
		PM/PM ₁₀ /PM _{2.5}	\leq 0.36 lb/hr ⁽⁶⁾ \leq 0.15 gm/bhp-hr ⁽⁶⁾ \leq 0.2 gm/KW-hr ⁽⁶⁾
		Greenhouse Gases, CO _{2e}	\leq 162.85 lb/MMBtu
		Opacity	< 5%, except 5% to < 10% for \leq 2 minutes during any one hour

Table 7				
EU#	Operational / Production Limit	Air Contaminant	Emission Limit	
EU5	≤ 300 hours of operation per 12-month rolling period Ultra Low Sulfur Diesel Fuel Oil shall be the only fuel of use.	NO _x and VOC (NMHC as CH _{1.8}), Combined Total	≤ 2.44 lb/hr ⁽⁶⁾ ≤ 3.0 gm/bhp-hr ⁽⁶⁾ ≤ 4.0 gm/KW-hr ⁽⁶⁾	
		CO	≤ 2.14 lb/hr ⁽⁶⁾ ≤ 2.6 gm/bhp-hr ⁽⁶⁾ ≤ 3.5 gm/KW-hr ⁽⁶⁾	
		S in Fuel	≤ 0.0015% by weight	
	≤ 300 hours of operation per 12-month rolling period Ultra Low Sulfur Diesel Fuel Oil shall be the only fuel of use.	SO ₂	≤ 0.004 lb/hr ⁽⁶⁾	
		H ₂ SO ₄	≤ 0.0003 lb/hr ⁽⁶⁾	
		PM/PM ₁₀ /PM _{2.5}	≤ 0.12 lb/hr ⁽⁶⁾ ≤ 0.15 gm/bhp-hr ⁽⁶⁾ ≤ 0.2 gm/KW-hr ⁽⁶⁾	
		Greenhouse Gases, CO _{2e}	≤ 162.85 lb/MMBtu	
		Opacity	< 5%, except 5% to < 10% for ≤ 2 minutes during any one hour	
	EU1, EU2, EU3, EU4, EU5	NA	Smoke	310 CMR 7.06 (1)(a)
	Facility-Wide	NA	NO _x	≤ 144.8 TPY ⁽⁷⁾
CO			≤ 106.4 TPY ⁽⁷⁾	
VOC			≤ 28.0 TPY ⁽⁷⁾	
SO ₂			≤ 28.8 TPY ⁽⁷⁾	
PM/PM ₁₀ /PM _{2.5}			≤ 109.4 TPY ^(7, 8)	
NH ₃			≤ 51.0 TPY ⁽⁷⁾	
H ₂ SO ₄			≤ 18.8 TPY ⁽⁷⁾	
Pb			≤ 0.00013 TPY ⁽⁷⁾	
Formaldehyde or Single HAP			≤ 6.6 TPY ⁽⁷⁾	
Total HAPs			≤ 13.1 TPY ⁽⁷⁾	
CO ₂			≤ 2,277,333 TPY ⁽⁷⁾	
Greenhouse Gases, CO _{2e}	≤ 2,279,530 TPY ⁽⁷⁾			

Table 7 Notes:

1. Emission limits are one hour block averages and do not apply during start-ups and shutdowns.
2. Emission rates are based on burning natural gas in any one combustion turbine at a maximum natural gas firing rate of 2,449 MMBtu/hr, HHV, at 90 °F ambient temperature, 14.7 psia ambient pressure, and 60% ambient relative humidity (combustion turbine and duct burner combined). These constitute worst case emissions.
3. Start-ups include the time from flame-on in the combustor (after a period of downtime) until the minimum emissions compliance load (MECL) is reached. Shutdowns include the time from dropping below the MECL until flame-out.
4. Emission limits represent worst case emissions for cold start-ups. Emissions for warm and hot start-ups are

expected to be lower.

5. Opacity emission limits are one minute block averages.

6. Emission limits are one hour block averages and apply throughout the operating range, including during start-up and shutdown. Emissions are based on manufacturer's certifications using gaseous testing procedures in accordance with 40 CFR Part 89. VOC emissions are assumed to be equivalent to NMHC emissions. In accordance with the calculations found at 40 CFR 89.424 for No. 2 diesel fuel oil exhaust, NMHC mass emissions are calculated by assuming that each carbon atom is accompanied (using a weighted average) by 1.8 atoms of hydrogen (i.e. NMHC as CH_{1.8}), which corresponds to a gas density of 0.5746 kg/m³.

7. Facility emissions include the two CTG/HRSG pairs with duct burners (EU1 and EU2), the auxiliary boiler (EU3), the emergency diesel engine/generator set (EU4), the fire pump engine (EU5), and the auxiliary cooling tower. Emissions, except CO emissions, for each of EU1 and EU2 are based on 8,040 hours of natural gas firing per 12 month rolling period at 100% load and 50°F ambient temperature with no duct burner firing (2,130 MMBtu/hr, HHV) or evaporative cooling, and 720 hours of natural gas firing per 12 month rolling period at peak load (approximately 102% load) and 90°F ambient temperature with 100% duct burner firing (2,449 MMBtu/hr, HHV) and evaporative cooling, and include start-up and shutdown emissions. Worst case CO emissions for each of EU1 and EU2 are based on a typical annual operating scenario of 3,272 hours at full load and different seasonal emission rates depending on heat input rates, ambient temperatures, and duct burner/evaporative cooling status, and 36, 166, and 4 cold, warm, and hot start-up/shutdown cycles, respectively. Emissions for EU3 are based on 6,570 hours of natural gas firing per 12 month rolling period at 100% load (80 MMBtu/hr, HHV). Emissions for each of EU4 and EU5 are based on restricted operation of 300 hours per unit, including maintenance and periodic readiness testing, while firing ULSD having a sulfur content that does not exceed 0.0015% by weight. Worst case NO_x and VOC emissions for EU4 are assumed to be emitted at the EPA Tier 2 limit of 6.4 gm/KW-hr and the EPA Tier 1 limit of 1.3 gm/KW-hr, respectively. Worst case NO_x and VOC emissions for EU5 are assumed to be emitted at the EPA Tier 3 limit of 4.0 gm/KW-hr and the EPA Tier 1 limit of 1.3 gm/KW-hr, respectively. EPA Tier 1, 2, and 3 emission standards are published in the United States Code of Federal Regulations, Title 40, Part 89 [40 CFR Part 89]. There are no NH₃ emissions from the auxiliary boiler, emergency engine/generator set, fire pump engine, and auxiliary cooling tower. The auxiliary cooling tower contributes to PM/PM₁₀/PM_{2.5} emissions only based on 8,760 hours of operation per 12 month rolling period.

8. Emission limit is for the sum of filterable and condensable particulates, including sulfates.

9. Maximum fuel (natural gas only) heat input for each CTG/HRSG with duct burner is based on 8,040 hours of operation per 12 month rolling period at 100% load and 50°F ambient temperature with no duct burner firing (2,130 MMBtu/hr, HHV), and 720 hours of operation per 12 month rolling period at peak load (approximately 102% load) and 90°F ambient temperature with 100% duct burner firing (2,449 MMBtu/hr, HHV). Maximum total fuel heat input for the auxiliary boiler is based on 6,570 hours of operation per 12 month rolling period at 100% load (80 MMBtu/hr, HHV).

10. Emission limit is based on full (base) load (100% load) ISO corrected (59 °F, 14.7 psia, 60% humidity) heat rate of 6,940 Btu, higher heating value, per KW-hr net electrical output to the grid.

11. Emission limit is based on full (base) load (100% load) without duct firing ISO corrected (59 °F, 14.7 psia, 60% humidity) heat rate of 6,940 Btu, higher heating value, per KW-hr net electrical output to the grid and the EPA 40 CFR Part 75 default CO₂ emission factor of 118.9 lb/MMBtu. Compliance shall be determined during the initial emissions compliance test performed within 180 days after initial firing of the EU. If the EU does not meet this limit, then the Permittee shall remedy the EU's failure to meet this limit, and shall not combust fuel in the EU until the Permittee has shown compliance with this limit during a subsequent emissions compliance test.

12. Start-up and shutdown emission limits and duration are subject to revision by MassDEP based on review of compliance testing (stack testing) data and CEMs/COMs data generated from the first year of commercial operation.

13. NO_x emission limits are from 40 CFR Part 60 Subpart KKKK. Compliance with the more stringent LAER NO_x emission limits of this Plan Approval shall be deemed compliance with the NO_x limits from 40 CFR Part 60

Subpart KKKK.

14. Limit is based on an initial compliance test at full (base) (100% load) with no duct firing. Compliance demonstration shall be made by emissions compliance testing within 180 days after initial firing of each EU.

15. Limit is based on an initial compliance test at peak load (approximately 102% load) with 100% duct firing. Compliance demonstration shall be made by emissions compliance testing within 180 days after initial firing of each EU.

16. Emission limit is effective 365 days after initial firing of the EU and is based on a 365 day rolling average, net electrical output to the grid and the EPA 40 CFR Part 75 default CO₂ emission factor of 118.9 lb/MMBtu. A new 365 day rolling average emission rate shall be calculated each day by calculating the arithmetic average of all hourly emission rates for the preceding 365 days, excluding the hours in which the EU was not operating. Hourly CO₂ mass emissions (lb) shall be calculated by obtaining monitored and recorded actual hourly heat input (MMBtu) and multiplying by the EPA 40 CFR Part 75 default CO₂ emission factor of 118.9 lb/MMBtu.

17. Minimum Emissions Compliance Load (MECL) for EU1 and EU2 shall be a function of ambient temperature and other system parameters.

18. MECL for EU3 shall be determined during the initial emissions compliance testing to be performed within 180 days after initial firing of EU3.

Table 7 Key:

EU# = Emission Unit Number

No. = Number

NO_x = Nitrogen Oxides

CO = Carbon Monoxide

VOC = Volatile Organic Compounds

NMHC = Non-Methane Hydrocarbons

S = Sulfur

SO₂ = Sulfur Dioxide

PM = Total Particulate Matter

PM₁₀ = Particulate Matter less than or equal to 10 microns in diameter

PM_{2.5} = Particulate Matter less than or equal to 2.5 microns in diameter

NH₃ = Ammonia

H₂SO₄ = Sulfuric Acid

Pb = Lead

HAP = Hazardous Air Pollutants

CO₂ = Carbon Dioxide

CO_{2e} = Greenhouse Gases expressed as Carbon Dioxide equivalent and calculated by multiplying each of the six greenhouse gases (Carbon Dioxide, Nitrous Oxide, methane, Hydrofluorocarbons, Perfluorocarbons, Sulfur Hexafluoride) mass amount of emissions, in tons per year, by the gas's associated global warming potential published at Table A-1 of 40 CFR Part 98, Subpart A and summing the six resultant values.

lb = pounds

lb/hr = pounds per hour

MMBtu = million British thermal units, higher heating value (HHV) basis

lb/MMBtu = pounds per million British thermal units

ppmvd @ 15% O₂ = parts per million by volume, dry basis, corrected to 15 percent oxygen

ppmvd @ 3% O₂ = parts per million by volume, dry basis, corrected to 3 percent oxygen

scf = standard cubic feet

kg/m³ = kilograms per cubic meter

% = percent

gm/KW-hr = grams per Kilowatt-hour

lb/MW-hr = pounds per Megawatt-hour net electrical output to the grid

Btu/KW-hr = British thermal units per Kilowatt-hour net electrical output to the grid

TPY = tons per 12-month rolling period
°F = degrees Fahrenheit
psia = pounds per square inch, absolute
EPA = United States Environmental Protection Agency
CFR = Code of Federal Regulations
ISO = International Organization for Standardization
CTG/HRSG = combustion turbine generator/heat recovery steam generator
ULSD = Ultra Low Sulfur Diesel Fuel Oil containing a maximum of 0.0015 weight percent sulfur
CEMS = Continuous Emission Monitoring Systems
COMS = Continuous Opacity Monitoring Systems
HHV = higher heating value basis
MECL = minimum emissions compliance load
< = less than
> = greater than
≤ = less than or equal to
≥ = greater than or equal to
NA = Not Applicable

B. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

Stationary Combustion Turbines/Heat Recovery Steam Generators/Duct Burners (EU1 and EU2)

The NSPS, 40 CFR Part 60 Subpart KKKK, apply to stationary combustion turbines with a heat input rating greater than or equal to 10 MMBtu/hr, and which commenced construction, reconstruction, or modification after February 18, 2005. The NSPS, 40 CFR Part 60 Subpart KKKK, also apply to emissions from any associated HRSGs or duct burners, and therefore includes both the combustion turbines and the duct burners (EU1 and EU2) at the proposed Facility.

These NSPS allow the turbine owner or operator the choice of either a concentration based or output based NO_x emission standard. The concentration based limit is expressed in units of ppmvd @ 15% O₂. The output based emission limit is expressed in units of mass emissions per unit of useful recovered energy, nanograms per Joule (ng/J), or lb/MW-hr. The applicable NO_x emission standard for EU1 and EU2 is 15 ppmvd @ 15% O₂ or 54 ng/J of useful output (0.43 lb/MW-hr). The Permittee has ensured that the proposed Facility will comply with these limits through the use of dry low-NO_x combustion technology in conjunction with SCR add-on NO_x control technology to control NO_x emissions to 2.0 ppmvd @ 15% O₂ and 0.051 lb/MW-hr during natural gas firing, well below the NSPS limits.

The NSPS for SO₂ emissions are the same for all turbines regardless of size or fuel type. The NSPS for turbines located in the continental area prohibits the discharge into the atmosphere of any gases that contain SO₂ in excess of 110 ng/J (0.90 lb/MW-hr) gross energy output. The owner or operator of the turbine can choose to comply with either the SO₂ limit or the limit on the sulfur content of the fuel burned. For a turbine located in a continental area, the fuel sulfur content limit is 26 ng/J (0.060 lb SO₂/MMBtu) heat input. The Permittee will meet the NSPS for SO₂ by burning natural gas with sulfur content not exceeding 0.5 grains sulfur per 100 standard cubic feet of gas fired (0.0015 lb SO₂/MMBtu), well below the NSPS limit.

The Permittee shall comply with all applicable emission standards, monitoring, record keeping, and reporting requirements of 40 CFR Part 60 Subpart KKKK for EU1 and EU2.

Auxiliary Boiler (EU3)

The NSPS, 40 CFR Part 60 Subpart Dc, apply to steam generating units for which construction commenced after June 9, 1989, and that have a heat input rating of between 10 and 100 MMBtu/hr. Based on the design heat input rating of 80 MMBtu/hr, HHV, the NSPS, 40 CFR Part 60 Subpart Dc, apply to the natural gas fired auxiliary boiler (EU3) at the Facility. For natural gas fired boilers, the NSPS does not impose specific emission limits.

The Permittee shall comply with all applicable monitoring, record keeping, and reporting requirements of 40 CFR Part 60 Subpart Dc for EU3.

Emergency Engine/Generator and Fire Pump Engine (EU4 and EU5)

The emergency generator (EU4) and fire pump (EU5) engines serving the Proposed Facility will both be subject to the NSPS under 40 CFR Part 60 Subpart IIII. The NSPS requires emergency generator engines to meet the non-road engine emission standards identified in 40 CFR Part 89.112 and 89.113. The fire pump engine will be subject to the emission standards identified in 40 CFR Part 60 Subpart IIII, Table 4. The NSPS require engine manufacturers to produce engines that comply with these standards. The Permittee shall install emergency generator and fire pump engines serving EU4 and EU5 that comply with the 40 CFR Part 60 Subpart IIII requirements.

The Permittee shall comply with all applicable emission standards, operating restrictions, monitoring, record keeping, and reporting requirements of 40 CFR Part 60 Subpart IIII for EU4 and EU5.

C. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) for the following Source Categories

Stationary Combustion Turbines/Heat Recovery Steam Generators/Duct Burners (EU1 and EU2)

The NESHAP at 40 CFR Part 63 Subpart YYYYY apply to combustion turbines at major sources of hazardous air pollutant (HAP) emissions. A major source of HAP emissions is a source which has the potential to emit ten (10) or more tons per year of any single HAP, or twenty five (25) or more tons per year of all HAPs combined. The proposed Facility is not a major source of HAP emissions. Therefore, the proposed Facility's combustion turbines are not subject to the 40 CFR Part 63 Subpart YYYYY requirements.

The proposed Facility's duct burners are considered "steam electric generating units" under the NESHAP. Steam electric generating units are regulated under 40 CFR Part 63 Subpart UUUUU. However, the NESHAP at 40 CFR Part 63 Subpart UUUUU only apply to coal and oil-fired steam electric generating units, and not to gas fired units such as the proposed Facility duct burners. Therefore, the duct burners are not subject to the 40 CFR Part 63 Subpart UUUUU requirements.

Auxiliary Boiler (EU3)

The NESHAP at 40 CFR Part 63 Subpart DDDDD for industrial, commercial, and institutional boilers apply only to major sources of HAP emissions. However, the Facility is not a major source of HAP emissions. Therefore, EU3 is not subject to the 40 CFR Part 63 Subpart DDDDD requirements.

The NESHAP at 40 CFR Part 63 Subpart JJJJJ for industrial, commercial, and institutional boilers apply to area (or minor) sources of HAP emissions, but do not include natural gas fired boilers. Since the auxiliary boiler shall fire natural gas only, it is not subject to the 40 CFR Part 63 Subpart JJJJJ requirements.

Emergency Engine/Generator and Fire Pump Engine (EU4 and EU5)

The NESHAP at 40 CFR Part 63 Subpart ZZZZ, for stationary reciprocating internal combustion engines (RICE) apply to both major and area sources of HAP emissions, and covers both emergency and non-emergency engines. Both EU4 and EU5 have stationary emergency engines that are subject to 40 CFR Part 63 Subpart ZZZZ. However, for new stationary emergency engines at area sources of HAP emissions that began construction or reconstruction after June 12, 2006, the NESHAP requirements are satisfied if the engines comply with the NSPS requirements under 40 CFR Part 60 Subpart III. The Permittee shall install emergency generator and fire pump engines serving EU4 and EU5 that comply with the 40 CFR Part 60 Subpart III requirements.

D. ALLOWANCES

The Permittee's proposed Facility is subject to various emission allowance programs. Emission allowance programs are market based air quality regulatory programs for which

various classes of emission sources are required to obtain, secure, and/or hold a sufficient number of “allowances” to cover actual reported emissions emanating therefrom. Allowances are measured in “tons” of emissions (one allowance equals one ton of emissions). At specified intervals, “true-up” occurs at which time allowances in the Permittee’s account are withdrawn to cover actual emissions over a specified time period. The Permittee is required to hold a sufficient number of allowances to cover reported emissions from the proposed Facility for the applicable time period as of the “true-up” date. The true-ups are done on a facility-wide basis, for emissions from all subject emission units at the proposed Facility. True-ups for annual SO₂ and ozone season NO_x (May through September) emissions are done annually. True-up for CO₂ emissions is done every three years.

These allowance programs require that actual facility emissions of SO₂, NO_x, and CO₂ (see Table 7, footnote 16) be monitored, recorded, and reported pursuant to documented monitoring plans and the regulatory provisions of 40 CFR Part 75.

Table 8 below contains the Permittee’s applicable allowance programs for each pollutant, including the applicable regulation(s) and subject EUs at the proposed Facility covered in this Proposed Plan Approval.

Table 8			
Pollutant	Program	Applicable Regulation	Subject Facility Emission Units
SO ₂	Acid Rain Program (ARP)	40 CFR Parts 72, 73, and 75	EU1, EU2
NO _x	NO _x Ozone Season Clean Air Interstate Rule (CAIR)	310 CMR 7.32	EU1, EU2
CO ₂	Regional Greenhouse Gas Initiative (RGGI) CO ₂ Budget Trading Program (State Only Requirement)	310 CMR 7.70	EU1, EU2

Table 8 Key:

- EU = Emission Unit
- ARP = Acid Rain Program
- CAIR = Clean Air Interstate Rule
- RGGI = Regional Greenhouse Gas Initiative
- CFR = Code of Federal Regulations
- CMR = Code of Massachusetts Regulations
- SO₂ = Sulfur Dioxide
- NO_x = Nitrogen Oxides
- CO₂ = Carbon Dioxide

The Permittee shall submit to MassDEP:

1. A Phase II Acid Rain Permit Application at least 24 months prior to commencement of commercial operation of any subject emission unit;
2. A CAIR Permit Application at least 18 months prior to commencement of commercial operation of any subject emission unit; and,
3. A CO₂ Budget Emission Control Plan (ECP) at least 12 months prior to commencement of commercial operation of any subject emission unit.

E. COMPLIANCE DEMONSTRATION

The proposed Facility is subject to, and the Permittee shall ensure that the proposed Facility shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 9, 10, and 11 below:

Table 9	
EU#	Monitoring and Testing Requirements
EU1, EU2, EU3	<p>1. The Permittee shall ensure that the proposed Facility is constructed to accommodate the emissions (compliance) testing requirements as stipulated in 40 CFR Part 60 Appendix A. The two outlet sampling ports (90 degrees apart from each other) for each emission unit must be located at a minimum of one duct diameter upstream and two duct diameters downstream of any flow disturbance. In addition, the Permittee shall facilitate access to the sampling ports and testing equipment by constructing platforms, ladders, or other necessary equipment.</p> <p>2. The Permittee shall ensure that compliance testing of the proposed Facility is completed within 180 days after initial firing of each EU to demonstrate compliance with the emission limits specified in Table 7 of this Proposed Plan Approval. All emissions testing shall be conducted in accordance with MassDEP’s “Guidelines for Source Emissions Testing” and in accordance with EPA reference test methods as specified in 40 CFR Part 60, Appendix A, 40 CFR Part 60 Subpart KKKK, 40 CFR Parts 72 and 75, or by another method which has been approved in writing by MassDEP. The Permittee shall schedule the compliance testing such that MassDEP personnel can witness it.</p>

Table 9	
EU#	Monitoring and Testing Requirements
EU1, EU2, EU3	<p>3. The Permittee shall conduct initial compliance tests of the proposed Facility to document actual emissions of EU1, EU2, and EU3 so as to determine their compliance status versus the emission limits (in lb/hr, lb/MMBtu, ppmvd, and lb/MW-hr, as applicable) in Table 7 for the pollutants listed below.</p> <p>Testing for these pollutants for EU1 and EU2 as specified below shall be conducted at four (4) load conditions that cover the entire normal operating range: the minimum emissions compliance load (MECL); 75 percent load; 100 percent (base) load without duct firing; and peak (approximately 102 percent load) with 100 percent duct firing.</p> <p>NO_x, CO, VOC, SO₂, PM, PM₁₀, PM_{2.5}, NH₃, CO₂, H₂SO₄, opacity</p> <p>Testing for these pollutants for EU3 as specified below shall be conducted at four (4) load conditions that cover the entire normal operating range: the MECL (to be determined during the compliance test); 50 percent load; 75 percent load; and 100 percent load.</p> <p>NO_x, CO, VOC, SO₂, PM, PM₁₀, PM_{2.5}, H₂SO₄, opacity</p>
	<p>4. The above referenced emissions testing shall include testing to develop a correlation between CO and VOC emissions for EU1 and EU2; parametric monitoring testing for PM, PM₁₀, and PM_{2.5} emissions for EU1 and EU2; and NO_x/CO emissions optimization testing for EU3.</p>
	<p>5. The Permittee shall conduct NO_x/CO optimization on, and tune, EU3 according to procedures contained in EPA 340/1-83-023 “Combustion Efficiency Optimization Manual for Operators of Oil and Gas Fired Boilers” with the goal of reducing air pollutant emissions to optimum levels. In addition, the Permittee shall tune EU3 in accordance with said procedures and inspect and maintain EU3 per manufacturer recommendations as well as test EU3 for efficient operation on an annual basis. The Permittee shall allow MassDEP personnel to witness tuning of EU3 if and when requested by MassDEP.</p>
	<p>6. The Permittee shall install, calibrate, test, and operate a Data Acquisition and Handling System(s) (DAHS), CEMS, and COMS serving EU1 and EU2 to measure and record the following emissions:</p> <p>a) O₂; b) NO_x; c) CO; e) NH₃; d) opacity.</p> <p>The Permittee shall install, calibrate, test, and operate a DAHS and COMS to measure and record opacity on EU3.</p>
	<p>7. The Permittee shall ensure that all emission monitors and recorders serving EU1, EU2 and EU3 comply with MassDEP approved performance and location specifications, and conform with the EPA monitoring specifications at 40 CFR 60.13 and 40 CFR Part 60 Appendices B and F, and all applicable portions of 40 CFR Parts 72 and 75, 310 CMR 7.32, and 310 CMR 7.70, as applicable.</p>
	<p>8. The Permittee shall ensure that the subject CEMS and COMS are equipped with properly operated and properly maintained audible and visible alarms to activate whenever emissions from the Facility exceed the limits established in Table 7 of this Plan Approval.</p>

Table 9	
EU#	Monitoring and Testing Requirements
EU1, EU2, EU3	<p>9. The Permittee shall operate each CEMS and/or COMS serving EU1, EU2 and EU3 at all times except for periods of CEMS and COMS calibration checks, zero and span adjustments, preventative maintenance, and periods of unavoidable malfunction.</p> <p>10. The Permittee shall obtain and record emissions data from each CEMS and/or COMS serving EU1, EU2 and EU3 for at least seventy (75) percent of each emission unit’s operating hours per day, for at least seventy five (75) percent of each emission unit’s operating hours per month, and for at least ninety five (95) percent of each emission unit’s operating hours per quarter, except for periods of CEMS and COMS calibration checks, zero and span adjustments, and preventive maintenance.</p> <p>11. All periods of excess emissions occurring at the Facility, even if attributable to an emergency/malfunction, start-up/shutdown or equipment cleaning, shall be quantified and included by the Permittee in the compilation of emissions and determination of compliance with the emission limits as stated in Table 7 of this Plan Approval. (“Excess Emissions” are defined as emissions which are in excess of the emission limits as stated in Table 7). An exceedance of emission limits in Table 7 due to an emergency or malfunction shall not be deemed a federally permitted release as that term is used in 42 U.S.C. Section 9601(10).</p> <p>12. The Permittee shall use and maintain its CEMS and/or COMS serving EU1, EU2 and EU3 as “direct-compliance” monitors to measure NO_x, CO, NH₃, O₂, and/or opacity. “Direct-compliance” monitors generate data that legally documents the compliance status of a source.</p> <p>13. The Permittee shall develop a quality assurance/quality control (QA/QC) program for the long-term operation of the CEMS and/or COMS serving EU1, EU2 and EU3 so as to conform with 40 CFR Part 60 Appendices B and F, all applicable portions of 40 CFR Parts 72 and 75, 310 CMR 7.32, and 310 CMR 7.70.</p> <p>14. The Permittee shall install, operate, and maintain a fuel metering device and recorder for EU1, EU2 and EU3 that records natural gas consumption in standard cubic feet (scf).</p> <p>15. The Permittee shall monitor fuel heat input rate (MMBtu/hr, HHV) and total fuel heat input (MMBtu) for EU1, EU2, and EU3.</p> <p>16. The Permittee shall monitor each date and daily hours of operation and total hours of operation for EU1, EU2, and EU3 per month and twelve month rolling period.</p>
EU1, EU2	<p>17. The Permittee shall ensure that initial compliance tests of the proposed Facility are conducted for “hot start”, “warm start”, “cold start”, and shutdown periods as defined in the Permittee’s Application for EU1 and EU2. These compliance tests shall represent periods of operation below the MECL for EU1 and EU2. Emission data generated from this testing shall be made available for review by MassDEP prior to determining and approving the maximum allowable emission limits for all pollutants listed in Table 7 (lb per event) and opacity limits, for these periods of time. MassDEP will incorporate these emission limits into a Final Plan Approval for the as-built Facility upon issuance and such limits shall be considered enforceable.</p> <p>18. Whenever either combustion turbine is operating below the MECL for start-up and shutdown, the VOC emissions shall be considered as occurring at the rate determined in the most recent compliance test for start-up/shutdown conditions.</p>

Table 9	
EU#	Monitoring and Testing Requirements
EU1, EU2	19. If either combustion turbine is operating at the MECL or greater, and if its CO emissions are below the CO emission limit at the given combustion turbine operating conditions, its VOC emissions shall be considered as meeting the emission limits contained in this Proposed Plan Approval, subject to correlation as contained in Condition 20 below.
	20. If either combustion turbine is operating at the MECL or greater, and if its CO emissions are above the CO emission limit at the given combustion turbine operating conditions, its VOC emissions shall be considered as occurring at a rate determined by the equation: $VOC_{actual} = VOC_{limit} \times (CO_{actual}/CO_{limit})$, pending the outcome of compliance testing, after which a VOC/CO correlation curve for each combustion turbine will be developed and used for VOC compliance determination purposes.
	21. The Permittee shall monitor the natural gas consumption of EU1 and EU2 in accordance with 40 CFR Part 60 Subpart KKKK utilizing a continuous monitoring system accurate to \pm 5 percent, and as approved by MassDEP.
	22. The Permittee shall monitor the sulfur content of the natural gas combusted by EU1 and EU2 in accordance with 40 CFR Part 60 Subpart KKKK, or pursuant to any alternative fuel monitoring schedule issued in accordance with 40 CFR Part 60 Subpart KKKK.
	23. The Permittee shall install and operate continuous monitors fitted with alarms to monitor continuously the temperatures at the inlets to the SCR and CO catalysts serving EU1 and EU2. In addition, the Permittee shall monitor the combustion turbine inlet and ambient temperatures for EU1 and EU2.
	24. The Permittee shall install and operate high and low level audible alarm monitors on the NH ₃ storage tank and shall ensure that they are properly maintained.
	25. The Permittee shall monitor the load, start-up and shutdown duration, and mass emissions (lb/event) during start-up and shutdown periods of EU1 and EU2.
	26. The Permittee shall monitor the operation of EU1 and EU2, in accordance with the surrogate methodology or parametric monitoring developed during the most recent compliance test concerning PM, PM ₁₀ , and PM _{2.5} emission limits.
	27. The Permittee shall monitor the SO ₂ and CO ₂ emissions in accordance with 40 CFR Part 75.
	28. The Permittee shall monitor the Greenhouse Gas emission rate utilizing the calculation procedures in 40 CFR Part 98 Subpart A, Table A-1.
	29. The Permittee shall continuously monitor the net electrical output to the grid of the proposed Facility.
EU4, EU5	30. The Permittee shall equip, operate, and maintain non-resettable hour meters on the emergency generator and fire pump engines in order to monitor the hours of operation of each emission unit.
	31. The Permittee shall monitor the quantity and sulfur content of ULSD fuel oil burned in EU4 and EU5.
Facility-Wide	32. The Permittee shall monitor all operations to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	33. If and when MassDEP requires it, the Permittee shall conduct compliance testing in accordance with EPA Reference Test Methods and 310 CMR 7.13.

Table 9 Key:

- EU# = Emission Unit Number
- EPA = United States Environmental Protection Agency
- CFR = Code of Federal Regulations
- CMR = Code of Massachusetts Regulations
- DAHS = Data Acquisition and Handling System
- CEMS = Continuous Emission Monitoring System
- COMS = Continuous Opacity Monitoring System
- SCR = Selective Catalytic Reduction
- QA/QC = Quality Assurance/Quality Control
- O₂ = Oxygen
- NO_x = Nitrogen Oxides
- CO = Carbon Monoxide
- NH₃ = Ammonia
- PM = Particulate Matter
- PM₁₀ = Particulate Matter less than or equal to 10 microns in size
- PM_{2.5} = Particulate Matter less than or equal to 2.5 microns in size
- VOC = Volatile Organic Compounds
- CO₂ = Carbon Dioxide
- SO₂ = Sulfur Dioxide
- H₂SO₄ = Sulfuric Acid
- lb = pounds
- lb/hr = pounds per hour
- lb/MMBtu = pounds per million British thermal units
- ppmvd = parts per million by volume, dry basis
- lb/MW-hr = pounds per MW-hr net electrical output to the grid
- scf = standard cubic feet
- MMBtu/hr = million British thermal units per hour
- MMBtu = million British thermal units
- HHV = higher heating value basis
- MECL = Minimum Emissions Compliance Load
- ULSD = Ultra Low Sulfur Diesel Fuel Oil containing a maximum of 0.0015weight percent sulfur

Table 10	
EU#	Record Keeping Requirements
EU1, EU2, EU3	<ol style="list-style-type: none"> 1. The Permittee shall maintain records of each emission unit’s hourly fuel heat input rate (MMBtu/hr, HHV), total fuel heat input (MMBtu), and natural gas consumption (scf) per month and twelve month rolling period basis. 2. The Permittee shall maintain records of each date and daily hours of operation and total hours of operation of each EU per month and twelve month rolling period. 3. The Permittee shall maintain on-site permanent records of output from all continuous monitors (including CEMS and COMS) for flue gas emissions and natural gas consumption (scf). 4. The Permittee shall maintain a log to record problems, upsets or failures associated with the subject emission control systems, DAHS, CEMS, and/or COMS serving EU1, EU2, and EU3, and the NH₃ handling system serving EU1 and EU2.
EU1, EU2	<ol style="list-style-type: none"> 5. The Permittee shall continuously estimate and record VOC emissions on the DAHS using the CO/VOC correlation curve developed from the most recent compliance test. 6. The Permittee shall continuously estimate and record PM, PM₁₀, and PM_{2.5} emissions on the DAHS using the surrogate methodology or parametric monitoring derived from the most recent compliance test.

Table 10	
EU#	Record Keeping Requirements
EU1, EU2	<p>7. The Permittee shall maintain records of the load, start-up and shutdown duration, and mass emissions (lb/event) during start-up and shutdown periods of EU1 and EU2.</p> <p>8. The Permittee shall maintain records of net electrical output to the grid from the Facility on a daily basis.</p> <p>9. The Permittee shall maintain records of the sulfur content of the natural gas combusted by EU1 and EU2 at the frequency required pursuant to 40 CFR Part 60 Subpart KKKK, or pursuant to any alternative fuel monitoring schedule issued in accordance with 40 CFR Part 60 Subpart KKKK.</p> <p>10. The Permittee shall record SO₂ and CO₂ emissions from EU1 and EU2 in accordance with 40 CFR Part 75.</p> <p>11. The Permittee shall record the Greenhouse Gas emission rate of EU1 and EU2 on a daily basis utilizing the calculation procedures in 40 CFR Part 98 Subpart A, Table A-1.</p> <p>12. The Permittee shall maintain continuous records of SCR and CO control system inlet temperatures, combustion turbine inlet temperatures and ambient temperatures.</p> <p>13. The Permittee shall maintain the SOMP for the NH₃ handling system serving EU1 and EU2 in a convenient location and make them readily available to all employees.</p>
EU3	<p>14. The Permittee shall record and post conspicuously on or near EU3 the results of annual inspections, maintenance, and testing and the date(s) upon which it was performed.</p>
EU4, EU5	<p>15. The Permittee shall maintain a record of the quantity of ULSD fuel oil combusted in, and the total hours of operation of, EU4 and EU5 per month and per 12-month rolling period.</p> <p>16. The Permittee shall maintain a record of the sulfur content of each ULSD fuel oil delivery at the Facility.</p> <p>17. The Applicant shall maintain records concerning engine certifications as described in 310 CMR 7.26 (42)(e)1. at the Facility.</p>
Facility-Wide	<p>18. A record keeping system for the Facility shall be established and maintained up-to-date by the Permittee such that year-to-date information is readily available. Record keeping shall, at a minimum, include:</p> <p>a) Compliance records sufficient to document actual emissions from the Facility in order to determine compliance with what is allowed by this Proposed Plan Approval. Such records shall include, but are not limited to, fuel usage rates, emissions test results, monitoring equipment data and reports;</p> <p>b) Maintenance: A record of routine maintenance activities performed on the subject emission units' control equipment and monitoring equipment at the Facility including, at a minimum, the type or a description of the maintenance performed and the date(s) and time(s) the work was commenced and completed; and,</p> <p>c) Malfunctions: A record of all malfunctions on the subject emission units' control and monitoring equipment at the Facility including, at a minimum: the date and time the malfunction occurred; a description of the malfunction and the corrective action taken; the date and time corrective actions were initiated; and the date and time corrective actions were completed.</p>

Table 10	
EU#	Record Keeping Requirements
Facility-Wide	19. The Permittee shall maintain all records required by 310 CMR 7.32, 310 CMR 7.70, 310 CMR 7.71 (Reporting of Greenhouse Gas Emissions), and 40 CFR Part 98 (Mandatory Greenhouse Gas Emissions Reporting) at the Facility.
	20. The Permittee shall maintain monthly records to demonstrate the Facility’s compliance status regarding the Facility-Wide emission limits (TPY) specified in Table 7. Records shall include actual emissions for the month as well as for the previous 11 months. (The MassDEP approved format can be downloaded at http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping in Microsoft Excel format.)
	21. The Permittee shall maintain a copy of this Plan Approval, underlying Application, and the most up-to-date Standard SOMP for each emission unit and PCD approved herein on-site.
	22. The Permittee shall maintain a complaint log concerning emissions, odor, and noise from the Facility. The Permittee shall make available to the general public a telephone number which receives and records complaints concerning the Facility 24 hours per day, 7 days per week. The complaint log shall be maintained for the most recent five (5) year period. The complaint log shall be made available to the public or MassDEP upon request. The Permittee shall take all reasonable actions to respond to said complaints in a timely manner.
	23. The Permittee shall maintain records for the annual preparation of a Source Registration/Emission Statement Form in accordance with 310 CMR 7.12.
	24. The Permittee shall maintain records of monitoring and testing as required by Table 9. All records required by this Plan Approval shall be kept on site for five (5) years and made available for inspection by MassDEP or EPA upon request.

Table 10 Key:

- EU# = Emission Unit Number
- PCD = Pollution Control Device
- SOMP = Standard Operating and Maintenance Procedures
- EPA = United States Environmental Protection Agency
- DAHS = Data Acquisition and Handling System
- CEMS = Continuous Emission Monitoring System
- COMS = Continuous Opacity Monitoring System
- SCR = Selective Catalytic Reduction
- CFR = Code of federal Regulations
- CMR = Code of Massachusetts Regulations
- CO = Carbon Monoxide
- NH₃ = Ammonia
- PM = Particulate Matter
- PM₁₀ = Particulate Matter less than or equal to 10 microns in size
- PM_{2.5} = Particulate Matter less than or equal to 2.5 microns in size
- VOC = Volatile Organic Compounds
- SO₂ = Sulfur Dioxide
- CO₂ = Carbon Monoxide
- ULSD = Ultra Low Sulfur Diesel Fuel Oil containing a maximum of 0.0015weight percent sulfur
- lb = pounds
- scf = standard cubic feet

MMBtu/hr = million British thermal units per hour

MMBtu = million British thermal units

HHV = higher heating value basis

TPY = tons per 12-month rolling period

Table 11	
EU#	Reporting Requirements
EU1, EU2, EU3	<p>1. The Permittee must obtain written MassDEP approval of an emissions test protocol prior to initial compliance emissions testing of EU1, EU2 and EU3 at the Facility. The protocol shall include a detailed description of sampling port locations, sampling equipment, sampling and analytical procedures, and operating conditions for any such emissions testing. In addition, the protocol shall include procedures for: a) the required CO and VOC correlation for EU1 and EU2; b) a parametric monitoring strategy to ensure continuous monitoring of PM, PM₁₀, and PM_{2.5} emission from EU1 and EU2; and c) procedures for the required NO_x and CO optimization for EU3. The protocol must be submitted to MassDEP at least 30 days prior to commencement of testing.</p> <p>2. The Permittee shall submit a final emissions test results report to MassDEP within 45 days after completion of the initial compliance emissions testing program.</p> <p>3. A QA/QC program plan for the CEMS and/or COMS serving EU1, EU2 and EU3 must be submitted, in writing, at least 30 days prior to commencement of commercial operation of the subject emission units. MassDEP must approve the QA/QC program prior to its implementation. Subsequent changes to the QA/QC program plan shall be submitted to MassDEP for MassDEP approval prior to their implementation.</p>

Table 11	
EU#	Reporting Requirements
EU1, EU2, EU3	<p>4. The Permittee shall submit a quarterly Excess Emissions Report to MassDEP by the thirtieth (30th) day of April, July, October, and January covering the previous calendar periods of January through March, April through June, July through September, and October through December, respectively. The report shall contain at least the following information:</p> <p>a) The Facility CEMS and COMS excess emissions data, in a format acceptable to MassDEP.</p> <p>b) For each period of all excess emissions or excursions from allowable operating conditions for the emission unit(s), the Permittee shall list the duration, cause, the response taken, and the amount of excess emissions. Periods of excess emissions shall include periods of start-up, shutdown, malfunction, emergency, equipment cleaning, and upsets or failures associated with the emission control system or CEMS or COMS. (“Malfunction” means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions. “Emergency” means any situation arising from sudden and reasonably unforeseeable events beyond the control of this source, including acts of God, which situation would require immediate corrective action to restore normal operation, and that causes the source to exceed a technology based limitation under the Plan Approval, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operations, operator error or decision to keep operating despite knowledge of these things.)</p> <p>c) A tabulation of periods of operation (including dispatch) of each emission unit and total hours of operation of each emission unit during the calendar quarter.</p>
EU1, EU2	<p>5. After completion of the initial compliance emissions testing program, the Permittee shall submit information for MassDEP review that documents the actual emissions impacts generated by EU1 and EU2 during start-up and shutdown periods versus any applicable NAAQS and SILs or the AALs and TELs for air toxics. This information shall be submitted to MassDEP as part of the final emissions test results report.</p> <p>6. The Permittee shall submit to MassDEP, in accordance with the provisions of Regulation 310 CMR 7.02(5)(c), plans and specifications for the main exhaust stack, CTGs, the SCR control system (including the NH₃ handling and storage system), the CO catalyst control system, and the CEMS, COMS, and DAHS once the specific information has been determined, but in any case not later than 30 days prior to commencement of construction/installation of each component of each subject emission unit.</p>
EU3	<p>7. The Permittee shall submit to MassDEP, in accordance with the provisions of Regulation 310 CMR 7.02(5)(c), the plans and specifications for the auxiliary boiler, and its Ultra Low NOx burner, exhaust stack, COMS and DAHS once the specific information has been determined, but in any case not later than 30 days prior to commencement of construction/installation of each component of EU3.</p>

Table 11	
EU#	Reporting Requirements
EU4, EU5	<p>8. The Permittee shall submit to MassDEP a certification for each engine in accordance with 310 CMR 7.26 (42)(e)1 not later than 30 days prior to commencement of its construction/installation.</p> <p>9. The Permittee shall submit to MassDEP, in accordance with the provisions of Regulation 310 CMR 7.02(5)(c), the plans and specifications for the emergency engine/generator set, fire pump engine, and associated exhaust stacks once the specific information has been determined, but in any case not later than 30 days prior to commencement of construction/installation of each component of the subject emission unit.</p>
Facility-Wide	<p>10. The Permittee shall submit to MassDEP a plan for monitoring and abating air and noise impacts during the period of construction of the proposed Facility.</p> <p>11. The Permittee shall submit, in writing, the following notifications to MassDEP within fourteen (14) days after each occurrence:</p> <ul style="list-style-type: none"> a) date of commencement of construction of each subject emission unit at the Facility; b) date when construction has been completed of each subject emission unit at the Facility; c) date of initial firing of each subject emission unit at the Facility; d) date when each subject emission unit at the Facility is either ready for commercial operation or has commenced commercial operation. <p>12. The Permittee shall submit to MassDEP an Operating Permit Application in accordance with 310 CMR 7.00: Appendix C no later than 12 months after commencement of commercial operation of the Facility.</p> <p>13. If the Facility is subject to 40 CFR Part 68, due to the presence of a regulated substance above a threshold quantity in a process, the Permittee must submit a Risk Management Plan no later than the date the regulated substance is first present above a threshold quantity.</p> <p>14. The Permittee shall report to EPA in accordance with 40 CFR Part 75.</p> <p>15. The Permittee shall comply with all applicable reporting requirements of 310 CMR 7.32, 310 CMR 7.70, 310 CMR 7.71 (Reporting of Greenhouse Gas Emissions), and 40 CFR Part 98 (Mandatory Greenhouse Gas Emissions Reporting).</p> <p>16. The Permittee must notify MassDEP by telephone or fax or e-mail [nero.air@massmail.state.ma.us] as soon as possible, but in any case no later than three (3) business days after the occurrence of any upsets or malfunctions to the Facility equipment, air pollution control equipment, or monitoring equipment which result in an excess emission to the air and/or a condition of air pollution.</p> <p>17. The Permittee shall notify MassDEP immediately by telephone or fax or e-mail [nero.air@massmail.state.ma.us] and within three (3) working days, in writing, of any upset or malfunction to the NH₃ handling or delivery systems that resulted in a release or threat of release of NH₃ to the ambient air at the Facility. In addition, the Permittee must comply with all notification procedures required under M.G.L. c. 21 E for any release or threat of release of NH₃.</p>

Table 11	
EU#	Reporting Requirements
Facility-Wide	<p>18. The Permittee shall submit a semi-annual report to MassDEP by July 30 and January 30 of each year to demonstrate the Facility’s compliance status regarding the Facility-Wide emission limits (TPY) specified in Table 7. Reports shall include actual emissions for the previous 12 months. (The MassDEP approved format can be downloaded at http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping in Microsoft Excel format.)</p> <p>19. The Permittee shall submit to MassDEP a SOMP for the subject emission units and associated control and monitoring/recording systems at the Facility no later than 30 days prior to commencement of commercial operation of the unit. Thereafter, the Permittee shall submit updated versions of the SOMP to MassDEP no later than thirty (30) days prior to the occurrence of a significant change. MassDEP must approve of significant changes to the SOMP prior to the SOMP becoming effective. The updated SOMP shall supersede prior versions of the SOMP.</p> <p>20. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a “Responsible Official” as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).</p> <p>21. All notifications and reporting to MassDEP required by this Plan Approval shall be made to the attention of:</p> <p style="padding-left: 20px;">Department of Environmental Protection/Bureau of Waste Prevention 205B Lowell Street Wilmington, Massachusetts 01887 Attn: Permit Chief Phone: (978) 694-3200 Fax: (978) 694-3499 E-Mail: nero.air@massmail.state.ma.us</p> <p>22. The Permittee shall report annually to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. The Permittee shall note therein any minor changes (under 310 CMR 7.02(2)(e), 7.03, 7.26, etc.), which did not require Plan Approval.</p> <p>23. The Permittee shall provide a copy to MassDEP of any record required to be maintained by this Plan Approval within thirty (30) days from MassDEP’s request.</p> <p>24. The Permittee shall submit to MassDEP for approval a stack emission pretest protocol, at least thirty (30) days prior to emission testing, for emission testing as defined in Table 9 Monitoring and Testing Requirements.</p> <p>25. The Permittee shall submit to MassDEP a final stack emission test results report, within forty five (45) days after emission testing, for emission testing as defined in Table 9 Monitoring and Testing Requirements.</p>

Table 11 Key:

EU# = Emission Unit Number
EPA = United States Environmental Protection Agency

CEMS = Continuous Emission Monitoring System
COMS = Continuous Opacity Monitoring System
DAHS = Data Acquisition and Handling System
CFR = Code of Federal Regulations
CMR = Code of Massachusetts Regulations
M.G.L. = Massachusetts General Laws
SOMP = Standard Operating and Maintenance Procedures
QA/QC = Quality Assurance/Quality Control
CTG = Combustion Turbine Generator
SCR = Selective Catalytic Reduction
TPY = tons per 12 month rolling period
NO_x = Oxides of Nitrogen
CO = Carbon Monoxide
NH₃ = Ammonia
PM = Particulate Matter
PM₁₀ = Particulate Matter less than or equal to 10 microns in size
PM_{2.5} = Particulate Matter less than or equal to 2.5 microns in size
VOC = Volatile Organic Compounds
NAAQS = National Ambient Air Quality Standards
SILs = Significant Impact Levels
AAL = Allowable Ambient Limit
TEL = Threshold Effects Exposure Limit

6. SPECIAL REQUIREMENTS

A. SPECIAL TERMS AND CONDITIONS

The Facility is subject to, and the Permittee shall ensure that the Facility shall comply with, the special terms and conditions as contained in Table 12 below:

Table 12	
EU#	Special Terms and Conditions
EU1, EU2	<p>1. The Permittee shall not allow the combustion turbines at the Facility to operate below the MECL, except for start-ups and shutdowns. Emissions during start-ups and shutdowns shall be included in the TPY limits specified in Table 7.</p> <p>2. The Permittee shall ensure that the SCR control equipment serving EU1 and EU2 is operational whenever the turbine exhaust temperature at the SCR unit attains the minimum exhaust temperature specified by the SCR vendor and other system parameters are satisfied for SCR operation. The specific load at which this exhaust temperature and other system parameters are achieved will vary based on ambient conditions and whether the start-up is cold, warm, or hot.</p> <p>3. The Permittee shall maintain in the Facility control room, properly maintained, operable, portable NH₃ detectors for use during an NH₃ spill, or other emergency situation involving NH₃ at the Facility.</p>
EU1, EU2, EU3	<p>4. The Permittee shall develop as part of the Standard Operating Procedures for EU1, EU2, and EU3, an MECL optimization protocol to establish minimum operating load(s) that maintain compliance with all emission limitations at various ambient temperatures and conditions for each respective emission unit.</p>

Table 12	
EU#	Special Terms and Conditions
EU1, EU2, EU3	5. The Permittee shall maintain an adequate supply of spare parts on-site to maintain the on-line availability and data capture requirements for the CEMS and COMS equipment serving the Facility.
Facility-Wide	6. The Permittee shall properly train all personnel to operate the Facility and the control and monitoring equipment serving the Facility in accordance with vendor specifications. All persons responsible for the operation of the Facility shall sign a statement affirming that they have read and understand the approved SOMP. Refresher training shall be given by the Permittee to Facility personnel at least once annually.
	7. Prior to commencing construction of any emission unit at the Facility, the roadways serving said Facility shall be paved and maintained free of deposits that could result in excessive dust emissions.
	8. The Permittee shall comply with all provisions of 40 CFR Parts 72 and 75, 40 CFR Part 60, 40 CFR Part 63, 40 CFR Part 64, 40 CFR Part 68, 40 CFR Part 98, and 310 CMR 6.00 through 8.00 that are applicable to this Facility.
	9. All requirements of this Approval which apply to the Permittee shall apply to all subsequent owners and/or operators of the Facility.

Table 12 Key:

EU# = Emission Unit Number
CFR = Code of federal regulations
CMR = Code of Massachusetts Regulations
SOMP = Standard Operating and Maintenance Procedures
CEMS = Continuous Emission Monitoring System
COMS = Continuous Opacity Monitoring System
SCR = Selective Catalytic Reduction
NH₃ = Ammonia
TPY = tons per 12 month rolling period
MECL = Minimum Emissions Compliance Load

B. STACK INFORMATION

The Permittee shall install, maintain, and utilize exhaust stacks with the following parameters, as contained in Table 13 below, for the Emission Units that are regulated by this Plan Approval:

Table 13				
EU#	Stack Height Above Ground (feet)	Stack Inside Exit Dimensions (feet)	Stack Gas Exit Velocity Range (feet per second)	Stack Gas Exit Temperature Range (°F)
EU1, EU2 (1)	230 (Each Flue)	20 (Each Flue)	39.2 to 61.9 (Each Flue)	175 to 215 (Each Flue)
EU3 (1)	230	3	≤ 70.2	≤ 530
EU4	86	1	≤ 113.3	≤ 620

Table 13				
EU#	Stack Height Above Ground (feet)	Stack Inside Exit Dimensions (feet)	Stack Gas Exit Velocity Range (feet per second)	Stack Gas Exit Temperature Range (°F)
EU5	22	0.667	≤ 80.6	≤ 820

Table 13 Notes:

1. EU1, EU2, and EU3 shall emit through one stack, containing three (3) flues.

Table 13 Key:

EU# = Emission Unit Number
°F = degrees Fahrenheit
≤ = less than or equal to

C. NOISE (State-Only Requirement)

Daytime and nighttime sound measurements to determine ambient (background) sound levels were taken at twelve locations (ST1 through ST12 in Table 14). Two additional monitoring locations (R1 and R2 in Table 14) were added with data in the public record to expand the study area and supplement the measurement data set, as collected by the Permittee. Baseline sound measurements were taken on May 17/18, 2012 and November 20/21, 2012. Salem Harbor Station’s existing Boiler Units 3 and 4 were not operating during the measurement time periods. It is expected that the National Grid substation transformers will remain operating at the site even after the existing facility has been demolished; therefore, sound measurements included operation of these transformers. The sound measurements consisted of both A-weighted sound levels and octave band sound levels. A-weighted sound levels emphasize the middle frequency sounds and de-emphasize lower and higher frequency sounds, and are reported in decibels designated as “dBA”. The A-weighted sound levels were recorded for each of the five categories most commonly used to describe ambient environments: L₉₀, L₅₀, L₁₀, L_{max}, and L_{eq}. The L₉₀ level represents the sound level exceeded 90 percent of the time and is used by MassDEP for the regulation of sound emissions.

In general, background (L₉₀) levels (in dBA) at locations ST1 through ST12 averaged from 36 to 49 during nighttime hours (with the exception of location ST9 where no nighttime measurements were taken) and from 39 to 51 during daytime hours. To compensate for nighttime measurements taken before midnight instead of during the typically quietest time of the day (12AM to 4AM), the Permittee conservatively deducted 2 dBA from the measured ambient sound levels at locations ST1, ST2, ST5, ST6, and ST8.

Calculations of operational noise impacts from the proposed Facility were calculated using DataKustic GmbH’s CadnaA, a computer-aided noise abatement program (version 4.1.137). CadnaA conforms to International Standard ISO-9613.2, “Acoustics – Attenuation of Sound during Propagation Outdoors.” The method evaluated A-weighted sound pressure levels under meteorological conditions favorable to propagation from sources of known sound emissions.

The allowable sound levels generated from base load (100% load) operation of the proposed Facility by the Permittee are summarized in Table 14 below:

Table 14				
Location	Ambient (L₉₀,dBA) (1)	Facility (L₉₀,dBA)	Ambient and Facility (L₉₀,dBA)	Increase Over Ambient (dBA) (2)
ST1 – Located to the North/ Residences near 39 Fort Avenue	47	44	49	2
ST2 - Existing Property Line to the West/Block House Square/Residences near Fort Avenue and Derby Street Intersection	42	44	46	4
ST3 – Located to the Northeast/25 Memorial Drive/Bentley Elementary School	39	41	43	4
ST4 – Existing Property Line to the Southwest/Residences near Intersection of Webb Street and Derby Street/23 Derby Street	39	43	44	5
ST5 – Existing Property Line to the Southwest/59 Derby Street	39	44	45	6
ST6 – Located to the East across Salem Harbor/76 Naugus Avenue (Marblehead)	36	34	38	2
ST7 – Located to the East/Winter Island Park (Harbormaster Office)	39	39	42	3
ST8 – Located to the Northeast/Intersection of Fort Avenue and Winter Island Road/Winter Island Road	38	33	39	1
ST9 – Existing Property Line to the South/Blaney Street Pier on Salem Wharf	39	42	44	5

Table 14				
Location	Ambient (L₉₀,dBA) (1)	Facility (L₉₀,dBA)	Ambient and Facility (L₉₀,dBA)	Increase Over Ambient (dBA) (2)
ST10 – Southwest Corner of the Existing Property/Mackey Building/Art Gallery	36	41	42	6
ST11 – Near House of Seven Gables across from 41 Turner Street	39	37	41	2
ST12 – Pickering Wharf near Victoria’s Station approximately 100 feet behind Sail Schooner “Fame” Kiosk	41	32	42	1
R1 – Plummer House	40	33	41	1
R2 – Winter Island Road Residences	34	33	38	4

Table 14 Notes:

1. The lowest existing background levels observed during either nighttime or daytime where the sound level is exceeded 90 percent of the time (L₉₀) which is the level regulated by MassDEP Noise Policy 90-001.
2. MassDEP Noise Policy 90-001 limits sound level increases to no more than 10 dBA over the L₉₀ ambient levels. Pure tone conditions or tonal sounds, defined as any octave band level which exceeds the levels in adjacent octave bands by 3 dBA or more, are not allowed.

Table 14 Key:

L₉₀ = sound level exceeded 90 percent of the time
dBA = decibels, A-weighted

In addition, the Permittee shall comply with the following conditions:

1. The Facility shall be operated and maintained such that at all times:
 - a) No condition of air pollution shall be caused by sound as provided in 310 CMR 7.01.
 - b) No sound emissions resulting in noise shall occur as provided in 310 CMR 7.10 and MassDEP’s Noise Policy 90-001. MassDEP’s Noise Policy 90-001 limits increases over the existing L₉₀ background level to 10 dBA. Additionally, "pure tone" sounds, defined as any octave band level which exceeds the levels in adjacent octave bands by 3 dBA or more, are also prohibited. The Permittee, at a minimum, shall ensure that the Facility complies with said Policy.

2. Facility personnel shall continue to identify and evaluate all plant equipment that may cause a noise condition. Sources of noise include, but are not limited to: main exhaust stack containing three flues, ACC, CTG packages, combustion turbine air inlets, STG packages, HRSG packages, CTG step up transformers, STG step up transformers, screw type natural gas compressor, natural gas metering station, auxiliary boiler, and auxiliary cooling tower.

3. The Permittee shall perform the following measures or equivalent alternative measures at the proposed Facility as noise mitigation as indicated in (and in addition to) the Application and the Permittee's responses, dated April 12, June 10, and June 18, 2013, to MassDEP's requests for additional information with regard to noise mitigation:

- a) Enclose the CTG, low noise HRSG, and STG packages for EU1 and EU2 within acoustically treated buildings consisting of absorptive double layer acoustic walls constructed of steel skin, mineral wool, and perforated metal interior designed for a Sound Transmission Class (STC) rating of 46. All ventilation openings and rooftop fans shall be acoustically silenced and attenuated. Machinery and personnel access into the buildings shall be through high performance acoustic doors.
- b) Enclose the natural gas compressor and metering station within an acoustically treated building with airways into the building and exhausts adequately sound attenuated through the use of silencers.
- c) Install GE 12 foot Silencers with Acoustic Plenums on combustion turbine inlet air filter houses for EU1 and EU2.
- d) Install turbine exhaust silencers in the HRSG discharge flow paths, either in the connecting ducts and/or in the vertical stack flues for EU1, EU2, and EU3 designed to meet a total sound power attenuation of 22 dBA and a 90-degree directional sound power level of 83 dbA or less at stack exits.
- e) Install ultra low noise CTG and STG step up transformers providing sound power levels (L_w) of 83 dBA for CTG step-up transformers and 90 dBA for STG step up transformers on EU1 and EU2, and enclose the transformers with firewalls/barriers to provide shielding to the receptors located on Derby Street to the west and the residential area to the south.
- f) Install ACC with low noise fans and Acoustic Louvers on the inlet of the ACC, which shall be designed to meet 51 dbA or less at 400 feet from the ACC.
- g) Install a retaining wall and berm surrounding the majority of the Facility site.

These noise mitigation measures, which result in a maximum increase of 6 dbA above ambient as shown in Table 14, are identified as Option 2 noise mitigation measures in the Permittee's June 18, 2013 Supplement to the Application amongst the four (4) options evaluated by the Permittee as compared to the reference (or standard) design noise mitigation measures for this type of facility.

4. The Permittee shall complete a sound survey in accordance with MassDEP procedures/guidelines within one hundred eighty (180) days after the Facility commences commercial operation, while the Facility is in operation, to verify compliance with the allowable sound levels specified in Table 14 of this Plan Approval. Prior to conducting the sound survey, the Permittee shall submit in writing to MassDEP for review a sound survey protocol at least thirty (30) days prior to commencing the sound survey. The Permittee shall submit to MassDEP a written report, describing the results of the required sound survey, within 45 days after its completion.

D. CONSTRUCTION REQUIREMENTS

Construction of the Facility will result in temporary increases in sound levels near the site. The construction process will require the use of equipment that will be audible from off site locations during certain time periods. Facility construction consists of site clearing, excavation, foundation work, steel erection, mechanical work, and finishing work. Work on these phases will overlap. Pile driving, generally considered the loudest construction activity, may also be required during the excavation phase to provide proper structural support for the combustion turbine building foundation. No blasting would be performed on site. Construction of the Facility is expected to begin in June 2014 and continue for a period of approximately 23 months.

In order to minimize construction noise impacts, the Permittee shall, at minimum, install and maintain a non-retractable temporary sound wall, 12 feet in height, constructed of $\frac{3}{4}$ inch Medium Density Overlay (MD) plywood, or other material of equivalent utility and appearance, having a surface weight of 2 pounds per square foot or greater. These specifications are based upon a Sound Transmission Class of STC 30, or greater, per American Society for Testing and Materials (ASTM) Test Method E90, having glass fiber, mineral wool, or other similar type sound absorptive surface material at least 2 inches thick on the side facing the site with a Noise Reduction Coefficient rating of NRC-0.85, or greater, per ASTM Test Method C423. When the barrier units are joined together, the mating surfaces of the barrier sides are flush with each other and gaps between barrier units and the bottom edges of the barrier panels and the ground are closed with material of sufficient density to attenuate sound. The Permittee shall install and maintain in good repair said temporary noise barrier, or equivalent, throughout the duration of the construction of the Facility.

In addition, the Permittee shall comply with the following conditions during the construction phases of the Facility:

1. The Permittee shall ensure that Facility personnel take all reasonable precautions (noted below) to minimize air pollution episodes (dust, odor, and noise):
 - a) Personnel shall exercise care in operating any noise generating equipment (including mobile power equipment, power tools, etc.) at all times to minimize noise.
 - b) Construction vehicles transporting loose aggregate to or from the Facility shall be covered.

- c) Open storage areas, piles of soil, loose aggregate, etc. shall be covered or watered down as necessary to minimize dust emissions.
- d) Any spillage of loose aggregate and dirt deposits on any public roadway, leading to or from the Facility shall be removed by the next business day or sooner, if necessary. (A mobile mechanical sweeper equipped with a water spray is an acceptable method to minimize dust emissions).
- e) On-site roadways/excavation areas subject to vehicular traffic shall be watered down as necessary or treated with the application of a dust suppressant to minimize the generation of dust.

2. The Permittee shall ensure that all contractors associated with the construction of the Facility shall comply with MassDEP's Clean Air Construction Initiative. The main aspects of this program include:

- a) All contractors shall use ULSD oil in diesel-powered non-road vehicles.
- b) All non-road engines used on the construction site shall meet the applicable non-road engine standard limitations per 40 CFR 89.112.
- c) All contractors shall utilize the best available technology for reducing the emission of PM and NO_x for diesel-powered non-road vehicles. The best available technology for reducing the emission of pollutants is that which has been verified by EPA or the California Air Resources Board for use in non-road vehicles or on-road vehicles where such technology may also be used in non-road vehicles.
- d) All contractors shall turn off diesel combustion engines on construction equipment not in active use and on dump trucks that are idling while waiting to load or unload material for five minutes or more.
- e) All contractors shall establish a staging zone for trucks that are waiting to load or unload material at the work zone in a location where diesel emissions from the trucks will not be noticeable to the public, and;
- f) All contractors shall locate construction equipment away from sensitive receptors such as residents and passersby, fresh air intakes to buildings, air conditioners, and windows.

For informational purposes only, the City of Salem Code of Ordinances, Chapter 22, Section 22-1 governs construction noise, setting forth requirements on construction hours, allowable activities, and procedures for obtaining a special variance during times when certain construction activities are not allowed. Construction is allowed without a variance between the hours of 8:00 AM and 5:00 PM, Mondays through Saturdays, and at other times if it does not "create a noise disturbance across a residential property boundary". The same restrictions are imposed on the operation of drilling and/or blasting equipment, rock crushing machinery, pile driving or jack

hammers used in construction. Special variances can be granted by the building inspector for construction work on Sundays or holidays with prior approval of the City Council.

7. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

- A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).
- B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.
- C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.
- D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and/or EPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.
- E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.
- F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.
- G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.
- H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.
- I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.
- J. The Permittee shall conduct emission testing, if requested by MassDEP, in accordance with EPA Reference Test Methods and regulation 310 CMR 7.13. If required, a pretest protocol report shall be submitted to MassDEP at least 30 days prior to emission testing and the final test

results report shall be submitted within 45 days after emission testing.

K. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

8. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

The Facility was also subject to the requirements of the Massachusetts Environmental Policy Act (MEPA) Massachusetts General Laws (M.G.L.) Chapter 30, Sections 61-62I and Section 11.08 of the MEPA regulations at 301 CMR 11.00. On May 17, 2013, the Secretary of the Executive Office of Energy and Environmental Affairs issued a certificate that the Final Environmental Impact Report (FEIR) (EEA #14937) adequately and properly complied with the MEPA and its implementing regulations.

9. SECTION 61 FINDINGS

MassDEP has carefully considered the Permittee's Final Environmental Impact Report (FEIR) prior to taking action on their Plan Approval Application. MassDEP, in issuing this **Proposed Plan Approval**, requires the Permittee to use all feasible means and measures to avoid or minimize adverse environmental impacts. Measures MassDEP deems necessary to mitigate or prevent harm to the environment are included in the conditions of this **Proposed Plan Approval**. MassDEP has made its decision under applicable law based on a balancing, where appropriate, of environmental and socioeconomic objectives, as mandated by 301 CMR 11.01(4).

In the issuance of this **Proposed Plan Approval**, MassDEP has considered the reasonably foreseeable climate change impacts, including greenhouse gas (GHG) emissions and effects as addressed in the FEIR through the MEPA Greenhouse Gas Emissions Policy and Protocol and the GHG emission mitigation/adaptation measures adopted by the Permittee in the FEIR as referenced in the Secretary's Certificate of finding on the FEIR, dated May 17, 2013 (EOEA #14937). This finding incorporates by reference said mitigation/adaptation measures.

Pursuant to M.G.L. Chapter 30 Section 61 of the Massachusetts Environmental Policy Act, (MEPA), 301 CMR 11.12 of the MEPA regulations, and the Secretary's Certificate of finding on the FEIR, MassDEP's Section 61 Findings on the proposed Facility determining that all feasible measures have been taken to avoid or minimize impacts to the environment are presented here as follows.

Project Description

As described in the FEIR, the project consists of demolition of an existing coal-fired power plant, remediation of the site, and construction of a new 630 megawatt (MW) nominal electrical generating facility and associated infrastructure and equipment (the proposed Facility) on a 65-acre site in Salem. The proposed Facility will be fired by natural gas and include "quick-

start" capability (ability to generate 300 MW within 30 minutes of start-up and 630 MW within 60 minutes). Use of duct-firing under summer conditions, will increase capacity by 62 MW for a total of 692 MW. The project will have the capacity to generate 5.1 million megawatt hours (MWh) annually. The proposed Facility will be constructed on approximately 20 acres of the northwestern portion of site. The proposed Facility main stacks will be contained in a common collar with a height of 230 feet.

The Permittee will operate the existing power plant until its scheduled shut down on June 1, 2014. Construction is proposed to begin in June 2014 and will extend for approximately 23 months. Demolition will include removal of all above-ground features of the existing facility, including power plant buildings and equipment, stacks and precipitators, coal handling equipment, storage tanks and associated appurtenances such as spill prevention berms; and intake screen and pumphouse structures. The proposed Facility will include two quick-start natural gas fired Combustion Turbine Generators (CTG); two STGs; two Heat Recovery Steam Generators (HRSG), including pollution control equipment; an auxiliary steam boiler; administrative/warehouse/shops space; a service bay; an auxiliary bay; a water treatment facility; step-up transformers; an ammonia storage tank; two water tanks; and, air cooled condensers (ACC). The proposed Facility is not dual-fueled and, therefore, does not have the potential to use significant amounts of diesel fuel. It will include a diesel-fueled back-up generator and a diesel-fueled fire pump engine.

Environmental Impact

Construction of the Facility has the potential to generate noise and dust. Operation of the Facility will result in the emission of air pollutants including nitrogen oxides (NO_x), volatile organic compounds (VOC), and greenhouse gases (GHG).

Mitigation Measures

The project includes the following measures to avoid, minimize and mitigate impacts:

Air Pollution -

- use of a high-efficiency advanced turbine combined cycle technology, emission controls and reporting equipment to minimize all pollutants;
- use of natural gas will limit emissions of PM, SO₂ and HAPs compared to other fossil fuels;
- use of Dry Low NO_x turbine combustors in combination with SCR will reduce NO_x emissions;
- 183 tons per year of NO_x Emission Reduction Credits (ERC) will be obtained to meet NSR offset requirements;
- advanced combustor design, combustor practices, and use of a catalytic oxidation system in the HRSG will reduce emissions of CO and VOCs; and,
- quick start capability to minimize all pollutants associated with start-up.

GHG Emissions -

- use of combined cycle natural gas turbines;

- \$4 million in CO₂ allowances for RGGI offsets;
- solar PV array with potential to offset 175 tons per year GHG emissions;
- Administrative Building is designed to meet the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) Certification at the Platinum level and includes a green roof, geothermal heat pumps for heating and cooling, variable volume ventilation fans, increased insulation to minimize heat loss, lighting motion sensors, climate control and building energy management systems, a 10% reduction for lighting power density (LPD) (and identifies the potential for larger reductions), and water conserving fixtures that exceed building code requirements; and
- Operations Building includes a high albedo roof, geothermal heat pumps for heating and cooling; increased insulation to minimize heat loss, daylighting, lighting motion sensors; climate control, building energy management systems, a 10% reduction for LPD (and identifies the potential for larger reductions), a high albedo roof, and water conserving fixtures;
- the Permittee will provide a certification to the MEPA Office indicating that all of the measures proposed to mitigate GHG emissions, or measures that will achieve equivalent reductions (e.g. 56.5 tons per year reductions, or 29%, from Administrative Building and Operations Building), are included in the project; and,
- a commitment to provide a GHG analysis, prepared consistent with the MEPA GHG Policy and Protocol, for the subsequent redevelopment of the site (regardless of whether the proposed redevelopment exceeds EIR thresholds) as part of the NPC.

Noise -

- siting of Facility equipment to maximize distance between receptors and noise-producing equipment;
- acoustical treatment of combustion and steam turbine buildings;
- locating equipment within enclosures or buildings that provide noise attenuation through layers of insulation and siding;
- use of equipment silencers including a gas turbine inlet silencing package; a stack silencing package to reduce sound pressure levels in each flue of the stack structure, silencers on steam system vents and, as permitted by relevant codes, on safety and relief valves that release high pressure steam;
- gas turbines and steam turbines will be fully enclosed;
- steam turbine insulation will be designed to provide thermal and acoustical insulation;
- large pumps in the HRSG enclosure (boiler feed pumps) will be enclosed in additional acoustical structures as necessary;
- location of piping, valving and control systems within enclosures or underground to limit fluid transfer noise;
- larger fans that operate at slower speeds and shielding of fans by cowlings or other acoustical treatments on the ACC;
- intake filter houses, transformers, fuel gas compressors and boiler feed water pumps will be wrapped in acoustic barriers;

- acoustically designed barrier walls around transformers to shield sensitive receptors from transformer noise;
- gas compressors and gas metering enclosure will be designed with acoustic silencing; and
- construction of a retaining wall and planted berm will be constructed around the western, southern and eastern edges of the Facility to deflect sound.

Construction Period -

- dust suppression methods during demolition will include pre-cleaning of larger surfaces and structural members prior to demolition, water suppression sprays and misting to prevent airborne particulates, and enclosure of areas to prevent the migration of dust;
- dust suppression during earth moving will include use of water trucks to wet ground surface, stabilization of soils, and creation of wind breaks;
- noise mitigation including construction hour limits, establishment and enforcement of construction site and access road speed limits, mufflers on noise-producing construction equipment and vehicles, siting of noisiest equipment as far as possible from sensitive receptors, and maintenance of engine housing panels in the closed position;
- stabilized construction and exit points;
- use of ultra-low sulfur diesel (ULSD) fuel (15 parts per million sulfur) in off-road vehicles;
- anti-idling measures including turning off diesel combustion engines on construction equipment not in active use and limiting idling of dump trucks to five minutes or less;
- vehicles greater than 50 brake horsepower will have engines that meet EPA PM emission standards or emission control technology certified by manufacturers to meet or exceed emissions standards and emission control devices, such as diesel oxidation catalysts (DOCs) or diesel particulate filters (DPFs), will be installed on the exhaust system side of engine equipment;
- delivery of large pieces of equipment or material will be by barge to minimize impacts on local roadways.

Funding Responsibility

The Permittee has committed to funding all of the mitigation measures discussed in these Section 61 findings.

Summary of Section 61 Findings

Based upon its review of the MEPA documents, the Plan Approval Application and amendments thereof submitted to date and MassDEP's regulations, MassDEP finds that the terms and conditions of this Proposed Plan Approval constitute all feasible measures to avoid damage to the environment and will minimize and mitigate such damage to the maximum extent practicable. Implementation of the mitigation measures will occur in accordance with the terms and conditions set forth in this Proposed Plan Approval.

10. MASSACHUSETTS ENERGY FACILITIES SITING BOARD

The Energy Facility Siting Board (EFSB) has not issued approval under M.G.L. Chapter 164, § 69J¼ of the Permittee’s Petition to construct and operate the Facility at the time of issuance of this Proposed Plan Approval. Among other things, Section 69J¼ provides that “...no state agency of the Commonwealth shall issue a construction permit for any such generating facility unless the petition to construct such generating facility has been approved by [EFSB]”. Accordingly, MassDEP will not issue a final plan approval or PSD permit until EFSB has issued the approval required by Section 69J¼.

11. PUBLIC PARTICIPATION

This **Proposed Plan Approval** is subject to a public comment period. Attached is a **Public Notice** with publishing instructions. Please have the attached **Public Notice** published as instructed at your expense in newspapers of general circulation in the municipalities where the modifications are proposed. A minimum thirty (30) day public comment period will commence with the date of publication of the **Public Notice**. It is in your interest to publish this **Public Notice** as instructed and forward proof of publication to the attention of the Permit Chief, Bureau of Waste Prevention, at the address shown on this letterhead to avoid delays in processing your submittal. In addition to providing for a public comment period, MassDEP will hold a public hearing on the **Proposed Plan Approval**, the details of which are stated in the attached **Public Notice**.

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Should you have any questions concerning this Plan Approval, please contact Cosmo Buttaro by telephone at (978) 694-3281, or in writing at the letterhead address.

Sincerely,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Cosmo Buttaro
Environmental Engineer

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Edward J. Braczyk
Environmental Engineer

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

James E. Belsky
Regional Permit Chief
Bureau of Waste Prevention

Enclosures

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Mary Persky (hard copy), Cosmo Buttaro (hard copy), Susan Ruch (e-copy)